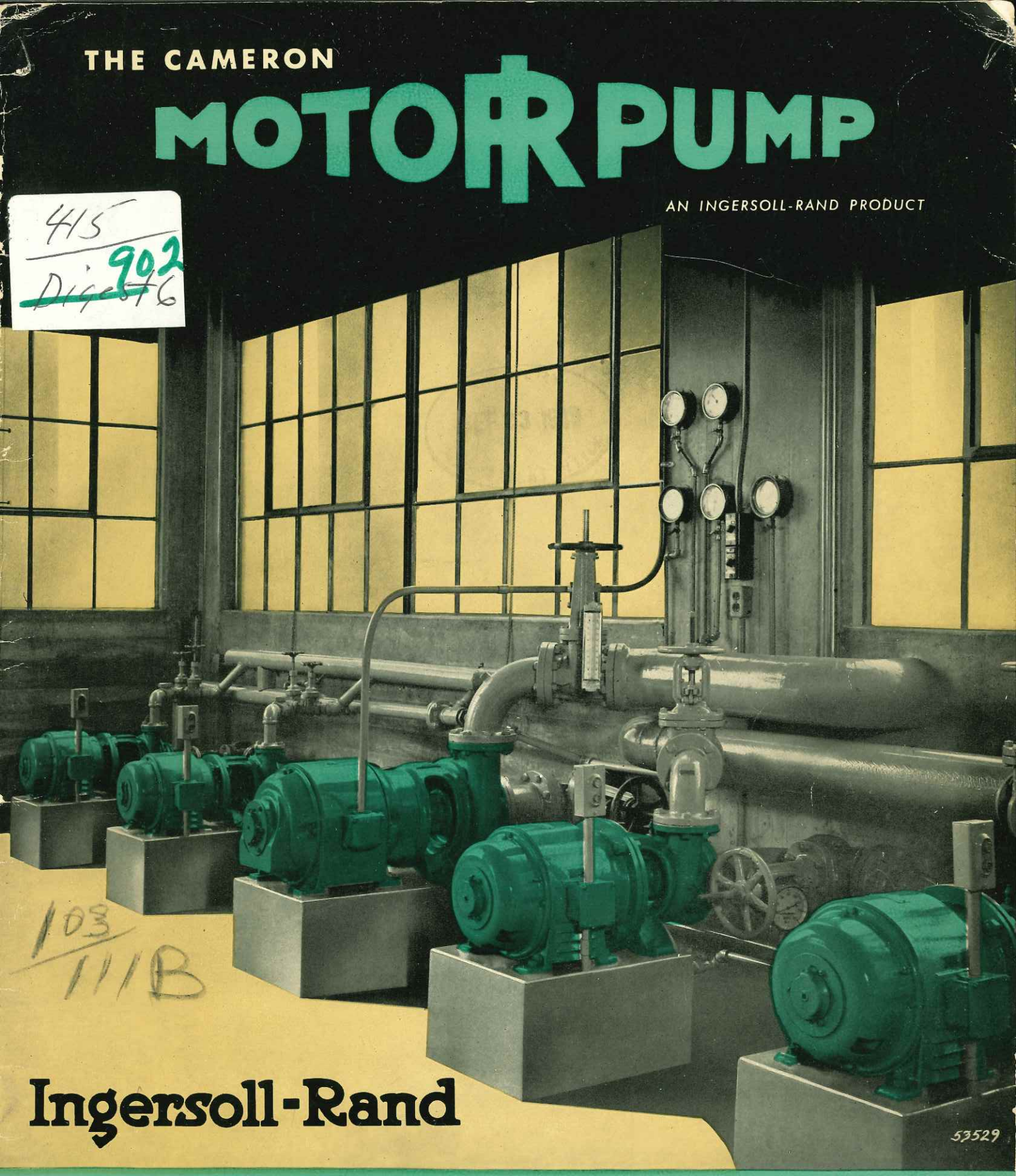
THE CAMERON

MOTOR PUMP

AN INGERSOLL-RAND PRODUCT



Ingersoll-Rand

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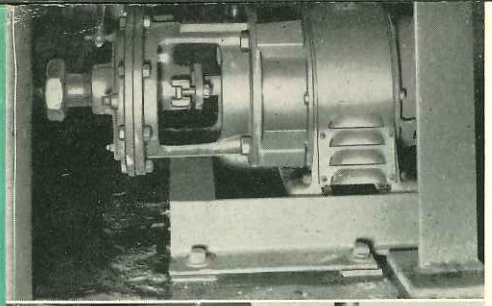
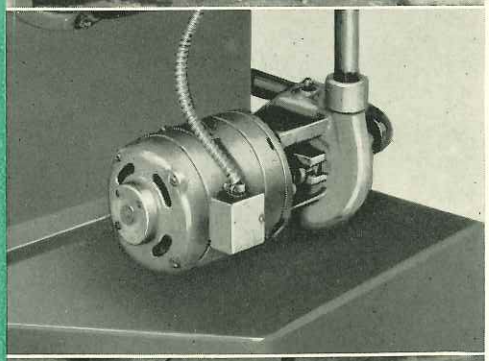
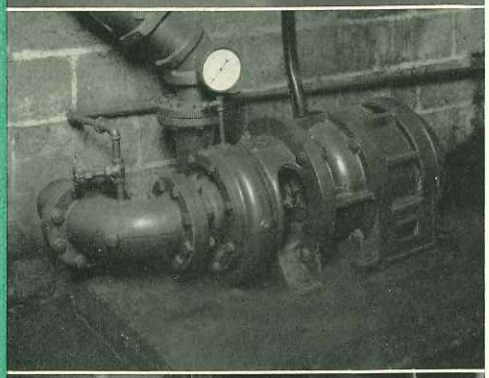
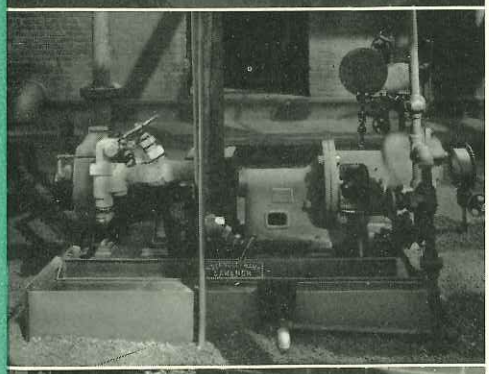
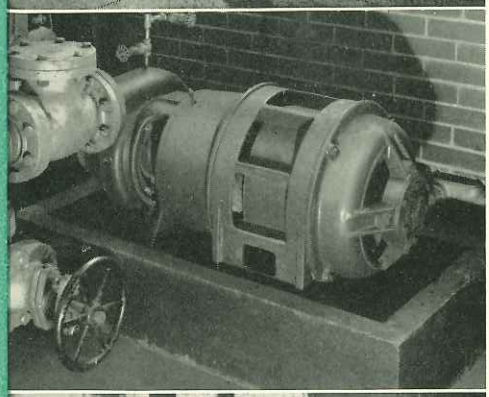
Form 7764

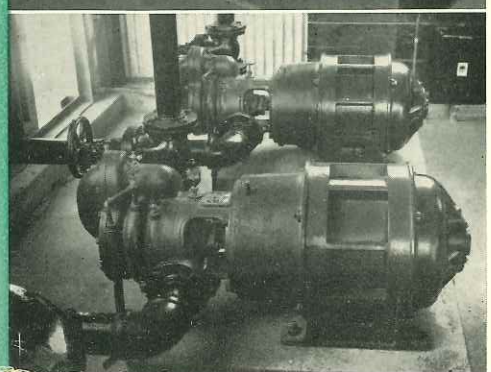










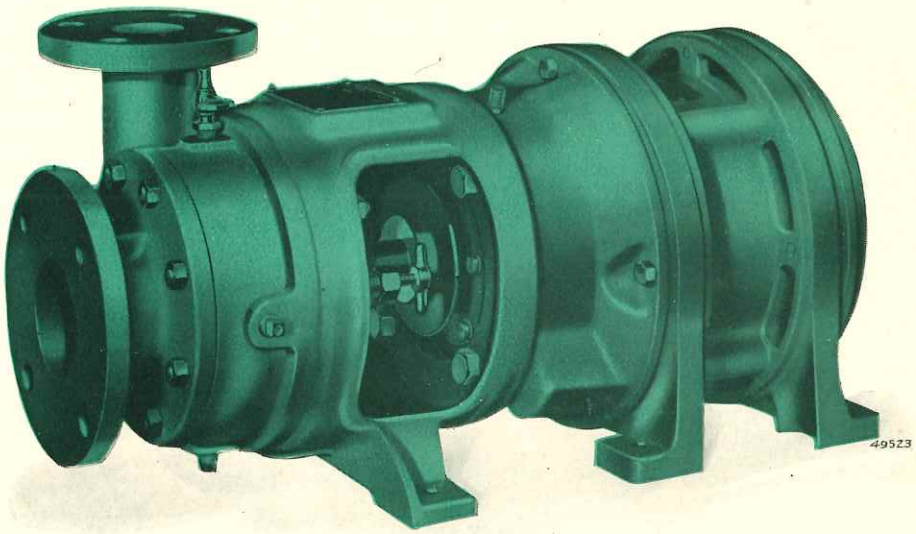


The Cameron

MOTORPUMP

—An Ingersoll-Rand Product

The Motorpump Turbine-Driven Pumps
Cradle-Mounted Pumps
Motorpump Condensate Return Units



Ingersoll-Rand

CAMERON PUMP DIVISION

11 Broadway New York, N. Y.

Form 7764

Adequate Facilities Assure Superior Quality

Part of the Motorpump assembly line.

Manufacturing Plant

The Cameron plant of Ingersoll-Rand is devoted exclusively to the manufacture of pumps. It is thoroughly modern in both buildings and equipment

Motorpumps are manufactured in a separate section of this plant. In this section are many special purpose machine tools designed for a specific operation on Motorpump parts.

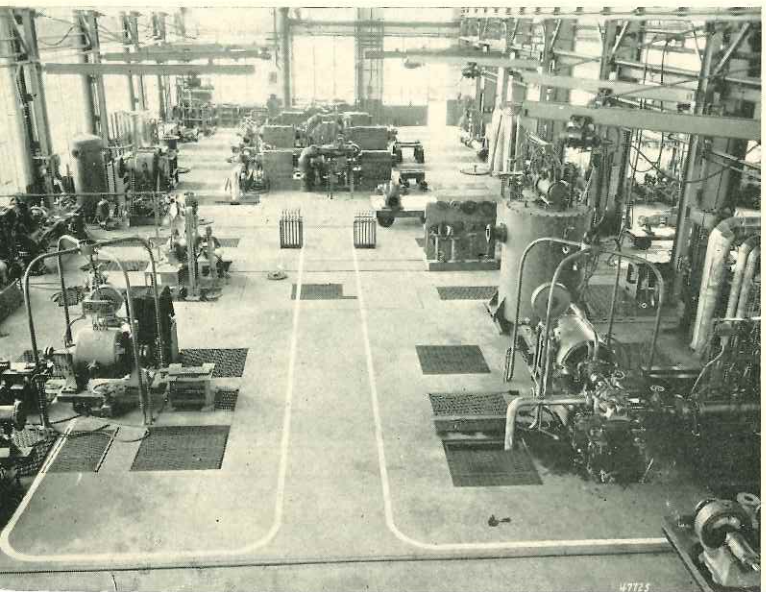
The modern equipment and the experienced personnel of this plant make possible the accurate workmanship and dependable service for which Motorpumps are known.

Photo-micrograph equipment in I-R metallurgical laboratory.

Metallurgical Laboratory

Ingersoll-Rand has an outstanding Metallurgical laboratory. It includes a completely equipped chemical laboratory, physical test laboratory, pilot heat treating plant, and photo-micrograph and magnaflux equipment.

All materials used in Motorpumps are selected and tested in this laboratory. Ingersoll-Rand engineers have had wide experience in selecting materials for pumps in normal service and for pumps handling corrosive or erosive liquids.



I-R pump testing laboratory.

Hydraulic Laboratory

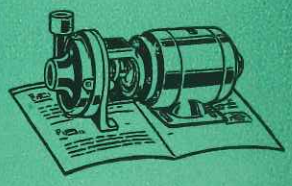
The facilities of the Ingersoll-Rand pump testing laboratory are unexcelled by those of any other pump manufacturer.

Equipment is available for producing and accurately measuring from 1/4 to 2700 hp. at speeds from 100 to 6500 rpm.

Money Saving MOTORPUMP Characteristics

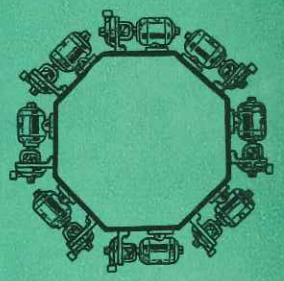
Compact design

The ½-hp. Motorpump takes up less room than this booklet lying open on your desk. Other sizes are proportionately small. This compactness is possible because the Cameron pump and the General Electric motor are built together as one unit on a single shaft.



Operation in any position

Motorpumps operate equally well in any position. No special foundation is required and the units may be bolted to the floor, wall, tank, column, or ceiling, as is most convenient.

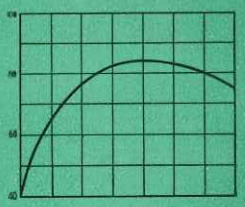


Low cost

The compact unit assembly simplifies the construction, lowers the weight, and reduces the purchase price.

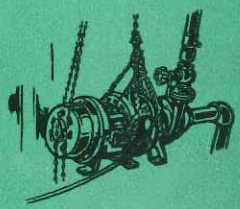
High efficiency

Motorpumps are designed to operate at standard motor speeds. The suction entrance is on the end and water enters directly into the eye of the impeller. This gives minimum obstruction and insures high efficiency.



Rugged construction

The compact design of the Motorpump makes it unusually rigid and strong. This strength assures ability to stand up under severe service.



Prompt shipment

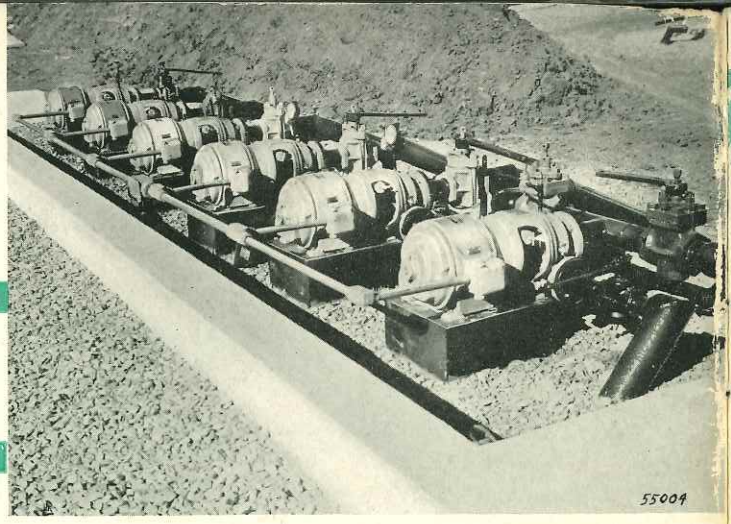
Large factory and branch warehouse stocks insure prompt shipment. Stock shipment can be made of units for all usual conditions.

The Cameron

MOTORPUMP

An Ingersoll-Rand Product

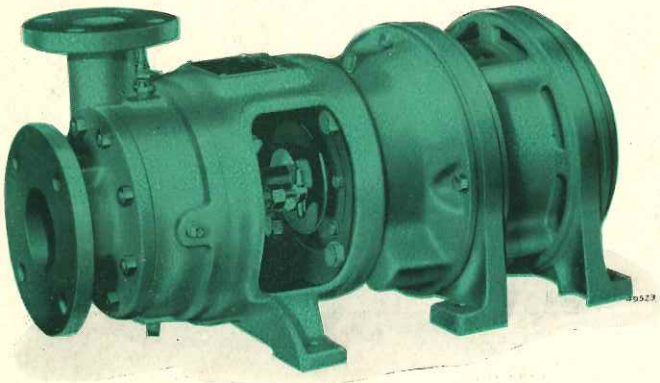
Heavy-Duty Type Classes RV and MRV



Six, single-stage Motorpumps at a bulk oil terminal.

Single-stage Units - Class RV

Class RV Heavy-Duty type Motorpumps are single-stage units with built-in electric motor. They are available in 1½, 2, 3, 4 and 5-inch discharge sizes with motors from 1 to 40 hp. They will handle from 10 to 1400 gals. per min. against heads to 240 ft.



Class RV, single-stage, heavy-duty Motorpump.

They are quality pumps in every respect. The shaft is of much larger diameter than is used in a standard motor. This insures a smooth running pump and minimum stuffing box care.

The bearing on the pump end of the unit is of the duplex, angular-contact type. It has several times the radial and thrust capacity of the bearing furnished on a standard motor.

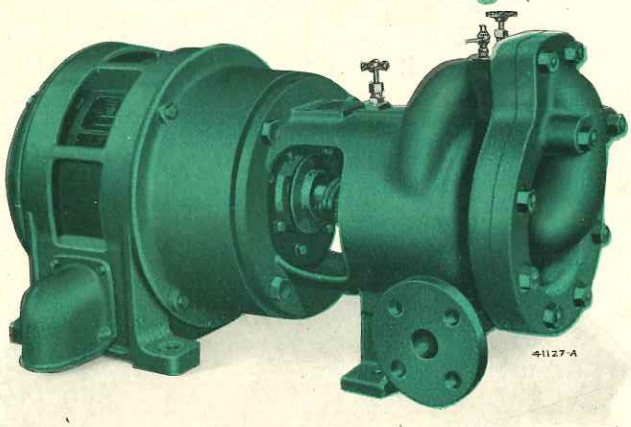
The impeller is balanced both mechanically and hydraulically. A convenient impeller puller makes disassembly easy.

The shaft is fully protected within the pump and through the stuffing box by the impeller and shaft sleeves. The shaft sleeve is packed to prevent leakage underneath the sleeve.

An adjustable needle valve provides proper stuffing box seal and lubrication.

Suction and discharge connections are standard flange type.

Two-Stage Units - Class MRV



Class MRV, two-stage, heavy-duty Motorpump.

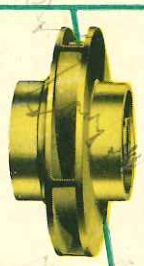
Class MRV Motorpumps are two-stage units available in 1½ and 2-inch discharge sizes with motors from 10 to 50 hp. They will handle from 20 to 275 gals. per min. against heads to 500 ft.

They are of the same heavy duty construction and have the same refinements as the single-stage units described above. The two impellers are of the single-suction type mounted back to back.

Suction and discharge connections are of standard flange type.

Features of Heavy-duty Motorpumps

IMPELLER

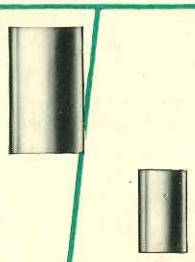


The impeller is of the latest hydraulic design. Mechanically and hydraulically balanced.
An impeller puller makes disassembly easy.

STUFFING BOX

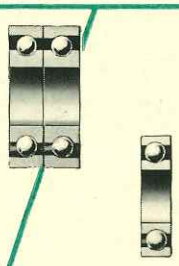
The stuffing box is unusually deep.
An adjustable valve controls sealing water.
Split gland is used.
Ample space is provided to facilitate repacking.

SHAFT



The shaft is oversize. Smooth running shaft reduces packing troubles.
The shaft is fully protected against wear and corrosion.

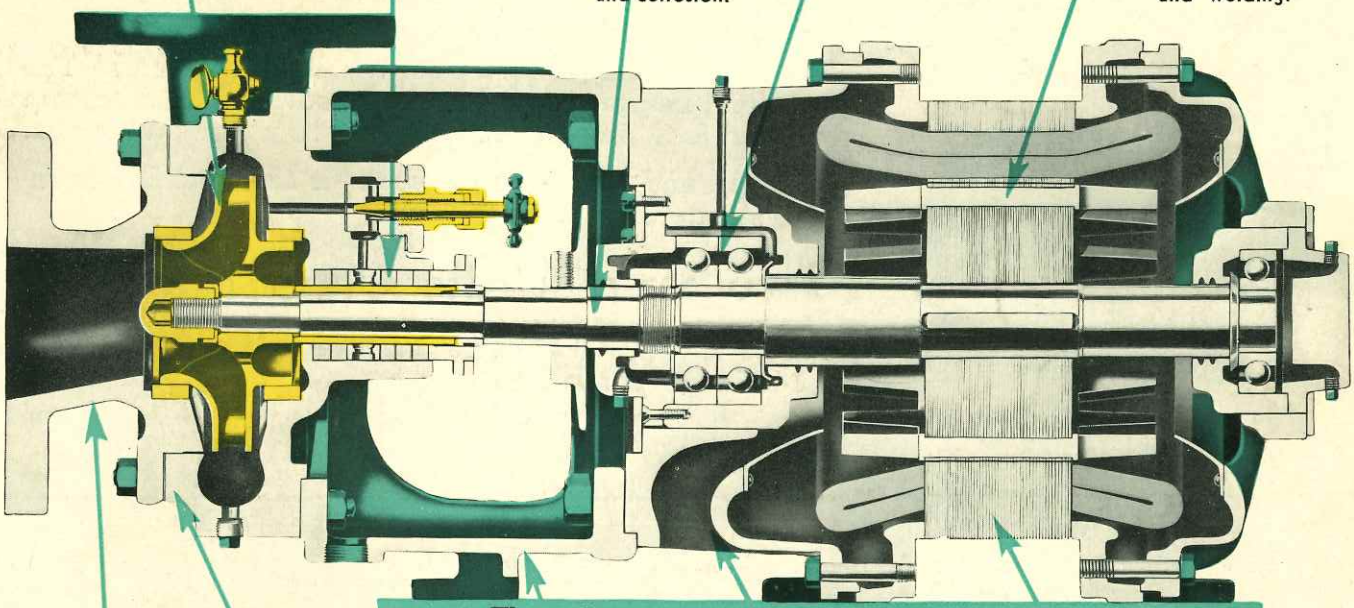
BEARINGS



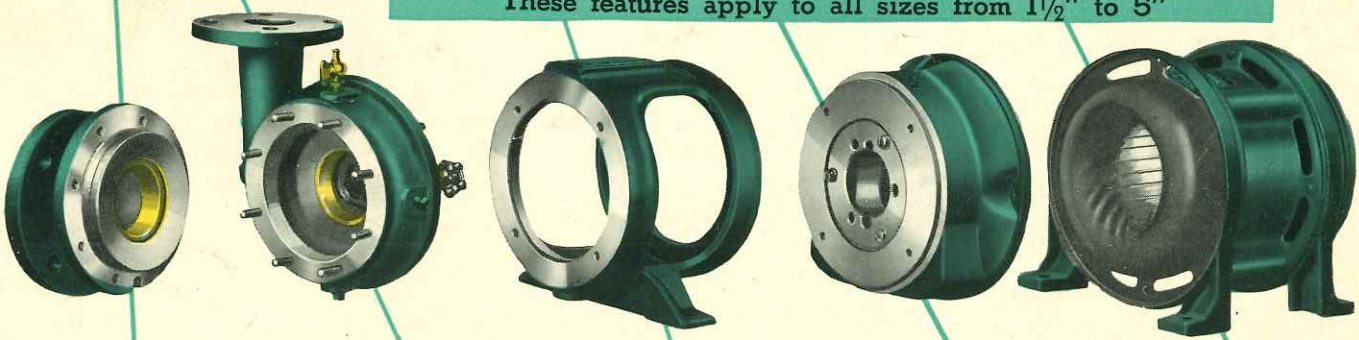
Bearings are oversize to carry combined pump and motor loads.
Bearing cartridge excludes dust and moisture.

MOTOR ROTOR

The rotor is in perfect balance.
Rotor laminations on polyphase motors are held in special aluminum alloy castings, eliminating the use of bolts, rivets and welding.



These features apply to all sizes from 1½" to 5"



SUCTION NOZZLE

Nozzle leads directly into eye of the impeller thereby reducing suction losses.
Removal of the nozzle gives complete access to the impeller and to the interior of the casing.

PUMP CASING

Flanged openings facilitate pipe connections.
Renewable casing rings assure full capacity, pressure, and efficiency during the life of the pump.

CONNECTING PIECE

Extra heavy, barrel-type construction insures rigidity.
Counter-bored joints insure permanent alignment.
Supporting legs carry the weight of the pump.

MOTOR END SHIELD

A diaphragm completely separates the pump from the motor.
A liquid flinger further protects bearings and motor windings from contamination.

MOTOR STATOR

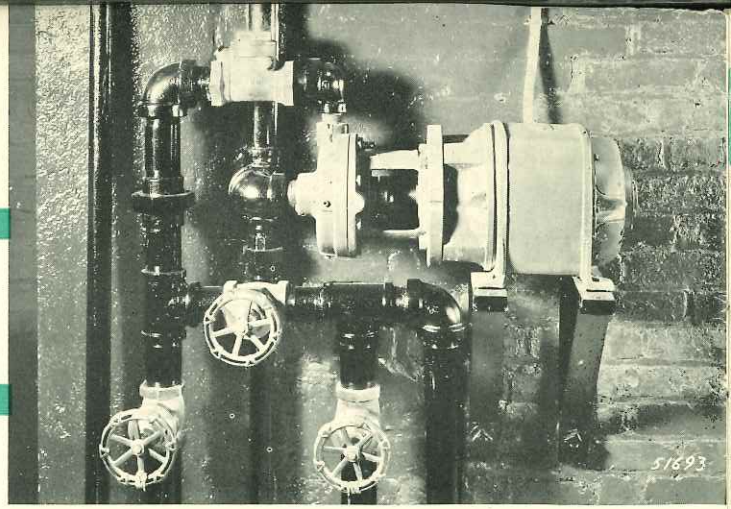
All windings are immersed in "Glyptol" which is acid, moisture and oil resisting and which binds wires into a solid mass.
The stator is standard and any electrical shop can service it.

The Cameron

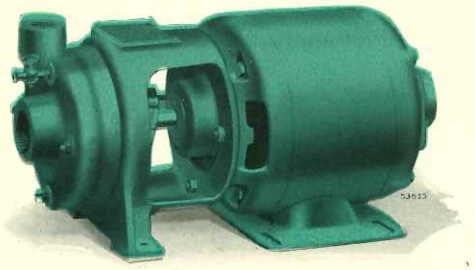
MOTORPUMP

An Ingersoll-Rand Product

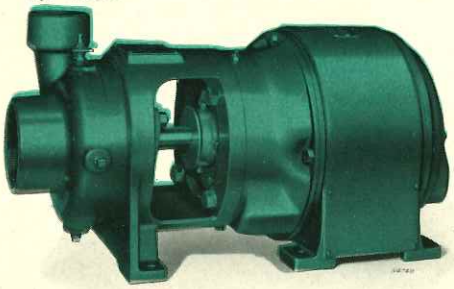
Standard Type Classes RVN and MRVN



Single-stage Class RVN Motorpump which circulates cooling water for a Diesel engine.



Class RVN standard Motorpump with fractional hp. motor.



Class RVN standard Motorpump with integral hp. motor.

Single-Stage Units Class RVN

Class RVN Motorpumps are single-stage units with built-in electric motor. They are available in 1, 1½ and 2-inch discharge sizes with motors from ¼ to 5 hp. They will handle from 5 to 250 gals. per min. against heads to 140 ft.

The shaft is larger than that in a standard motor. The pump end bearing is of the deep-groove, angular-contact type and is 2 sizes larger than that in a standard motor.

Suction and discharge connections are threaded to receive standard pipe.

Two-Stage Units Class MRVN

Class MRVN Motorpumps are two-stage units available in 1-inch discharge size with motors from 1½ to 5 hp. They will handle from 20 to 55 gals. per min. against heads to 200 ft.

Impeller

The one-piece impeller is of latest hydraulic design and is mechanically balanced.

Casing

The casing contains the suction and discharge nozzles. Discharge nozzle may be turned to four positions.

Stuffing Box

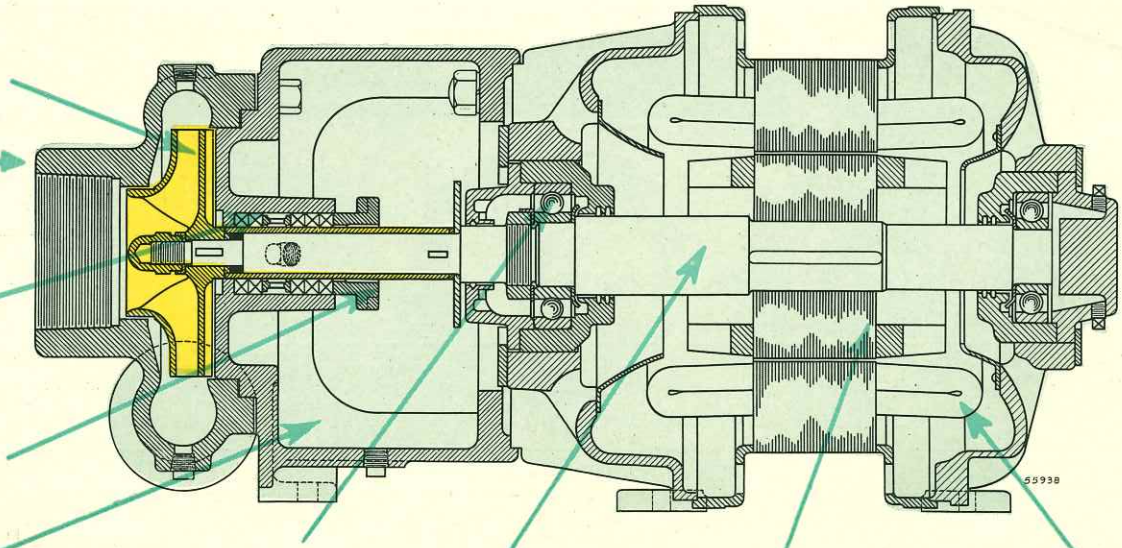
The stuffing box is extra deep, holding 5 rings of packing and a sealing gland.

Glands

The stuffing box glands are of the split type which are easily removed from the shaft.

Connecting Piece

The connecting piece has counterbored joints which assure a rigid assembly.



Bearings

The bearings are of the angular contact type with ample radial and thrust capacity.

Shaft

The shaft is much heavier than that in a standard motor insuring freedom from vibration.

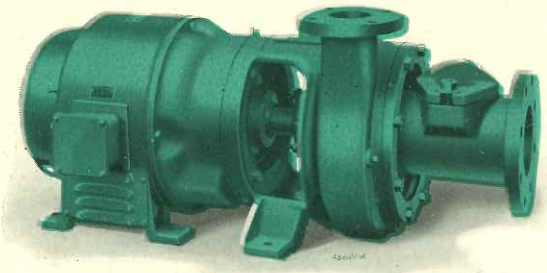
Rotor

The motor rotor is of standard construction and is perfectly balanced.

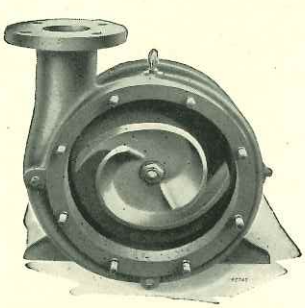
Stator

The stator is of standard construction and can be serviced in any electrical shop.

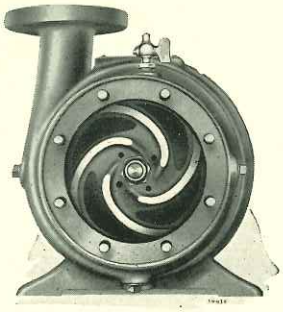
Open Impeller Motorpumps



Open impeller motorpumps may be equipped with the handhole type suction nozzle shown. Without this nozzle they look like the pumps on page 4.



Two-vane open impeller.



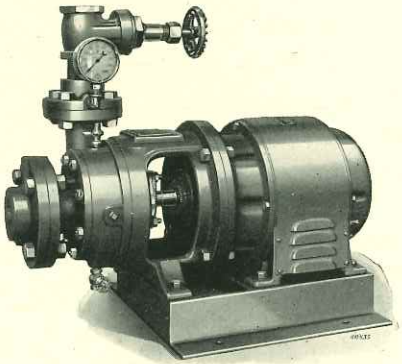
Four-vane open impeller.

For pumping paper stock, lime, sludge, sugar liquor, sewage, etc., which contain a certain amount of foreign material it is often necessary to use an open impeller pump. Motorpumps (also TRV and CRV units described on following pages) are available in many sizes with open impellers.

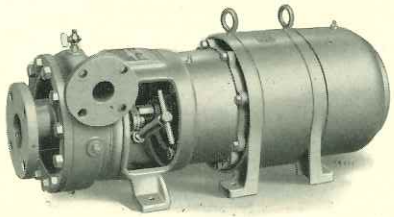
In external appearance they are exactly the same as the pumps described and illustrated on the preceding page. They may also be equipped with handhole type suction nozzle as illustrated at the left.

Open-impeller Motorpumps have a specially designed casing, impeller, and suction piece. The impellers have exceptionally large eyes, and the entrances have been carefully designed to prevent clogging. All passages are made amply large.

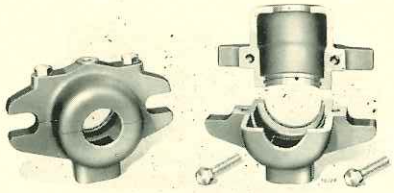
Motorpump Modifications



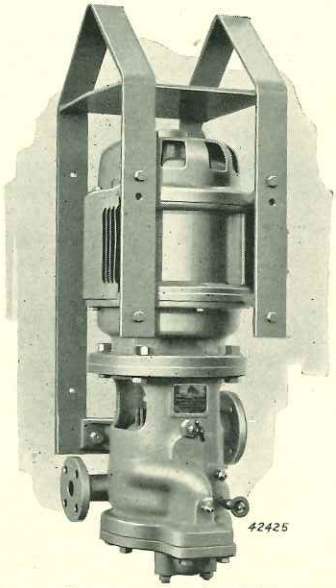
Brewery fittings including companion flanges, valve and gauge.



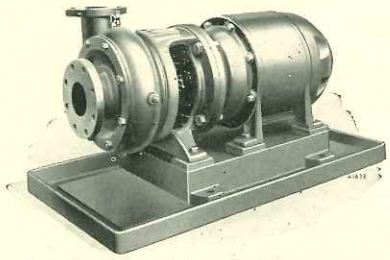
Merco-Nordstrum grease seal for pumps handling gasoline and other similar liquids.



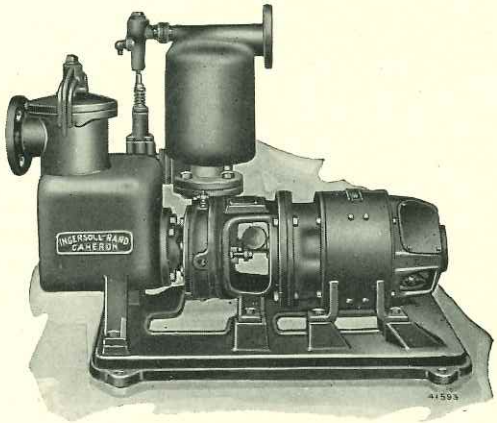
Smothering type glands for handling volatile liquids, etc.



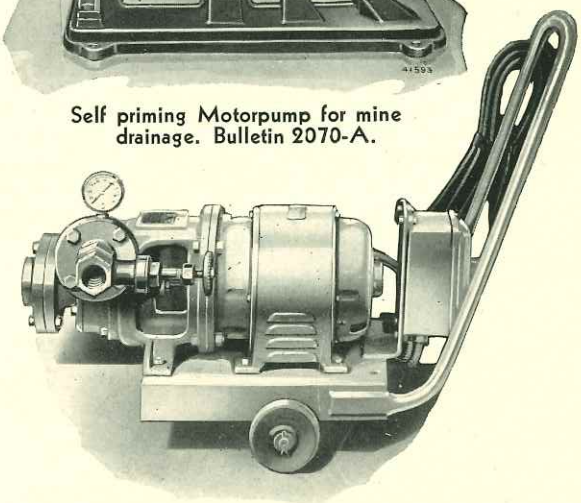
Sling yoke mounting for Motorpumps in mine shaft drainage service.



Drip-lip base plate which can be furnished for Motorpumps.



Self priming Motorpump for mine drainage. Bulletin 2070-A.

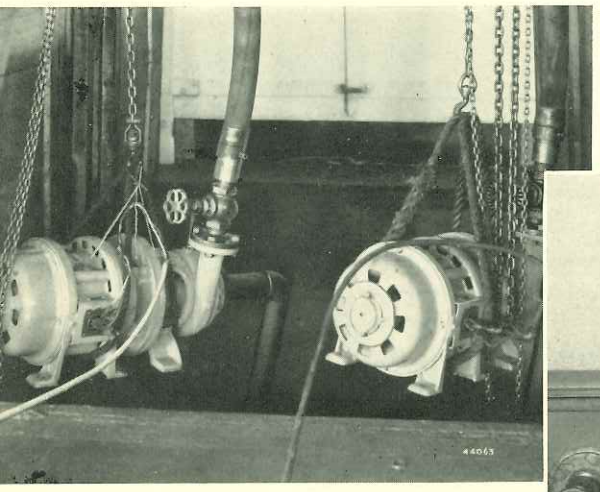


Portable Motorpump for use in breweries, wineries, distilleries, dairies and other industries where a portable pump is convenient.

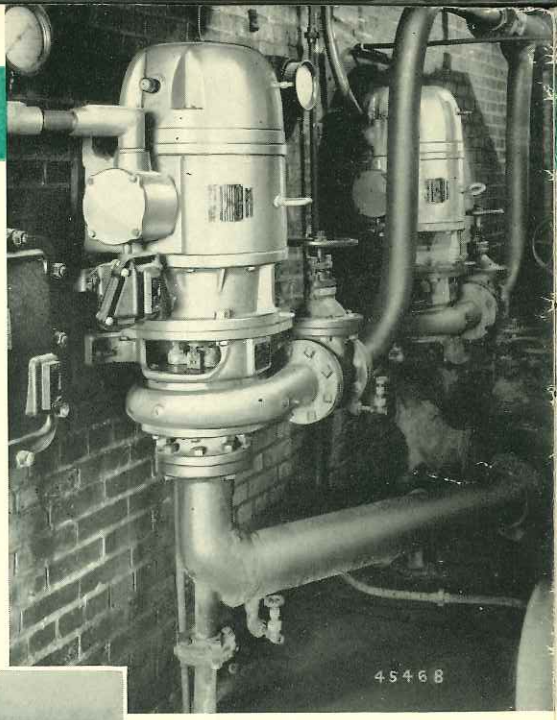
Operates In Any Position

The MOTORPUMP operates perfectly in any position. Hundreds of units are operating vertically, at various angles, on the side and upside down.

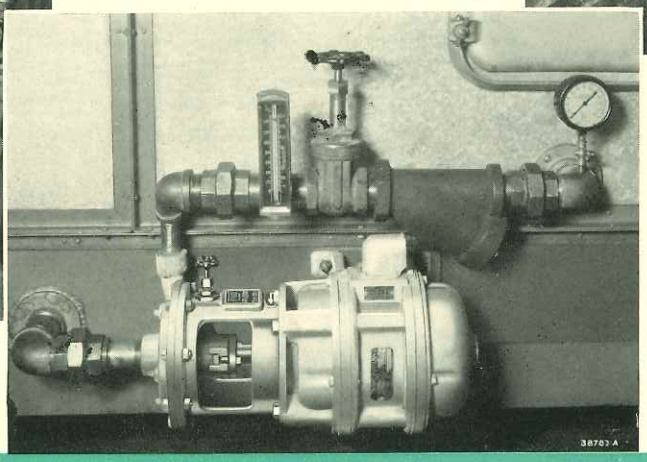
This performance is made possible by the sturdy ball bearings and the rigid construction of the unit. They need no special foundation and may be bolted to floor, wall or ceiling as is most convenient.



Two Motorpumps slung from chains for emergency pumping service.



Motorpump mounted on its side on an air conditioning unit.



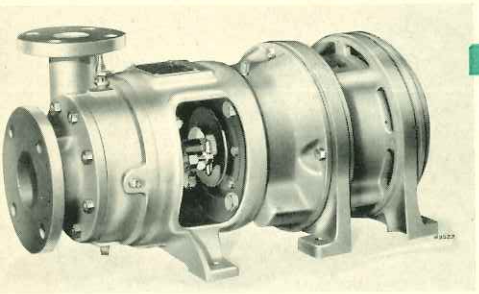
Two Motorpumps mounted vertically on the wall in a refinery.

All Types of Motors

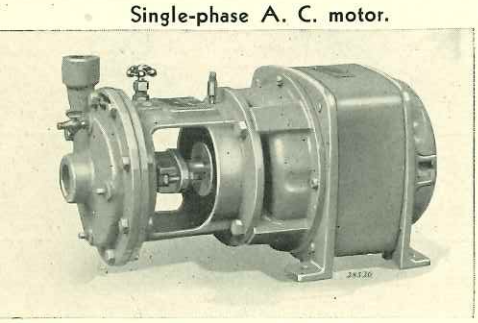
Each MOTORPUMP has a General Electric motor built into it as an integral part of the unit. They are available in all types for all usual current conditions, including 50 and 60 cycle, single and poly-phase alternating current and direct current. Open, splash-proof, totally enclosed fan cooled, explosion proof and marine type motors are furnished. More than 3000 types and enclosures are available.

The motors are of the ball bearing type and the bearings are of very liberal capacity. They are grease lubricated and the grease needs to be replenished only at long intervals.

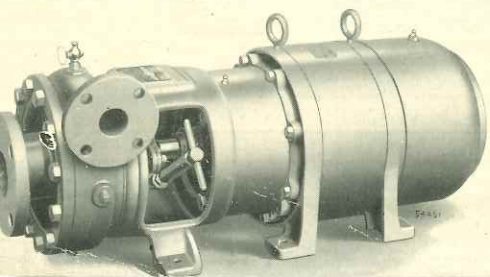
Poly-phase A. C. motor.



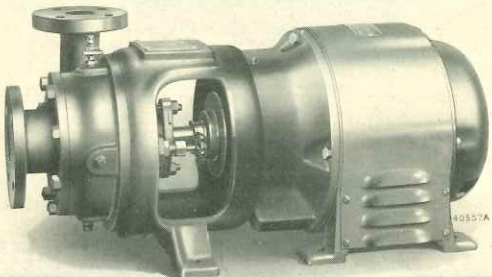
Single-phase A. C. motor.



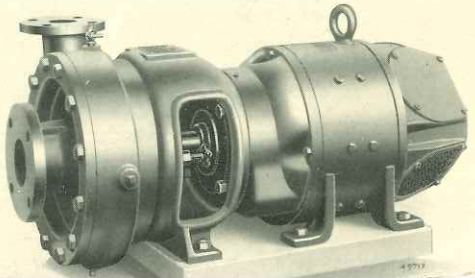
Explosion-proof motor.



Splash-proof motor.



Direct-current motor.

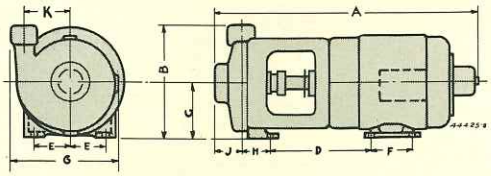


Approximate Dimensions

All dimensions given in inches.
Based on use of open type A. C. motors. Dimensions and shipping weights will vary slightly when other motors are used. Do not use these dimensions for building foundations.
Obtain certificate foundation print.

RVN and RVNS Pumps

Fractional hp. Motors



Size	Suct.	A	B	C	D	E	F	G	H	J	K	L	Shipping Wt.
1RVNS¼	1½	16⅞	7⅞	4⅛	6 1/32	3⅜	3¼	7⅞	1 13/16	1 31/32	3¾	3	100
1RVNS⅓	1½	16⅞	7⅞	4⅛	6 1/32	3⅜	3¼	7⅞	1 13/16	1 31/32	3¾	3	100
1RVNS½	1½	16⅞	7⅞	4⅛	6 1/32	3⅜	3¼	7⅞	1 13/16	1 31/32	3¾	3	100
1RVNS¾	1½	19⅛	7⅞	4⅛	5⅞	3⅜	5	7⅞	1 13/16	1 31/32	3¾	3	100
1RVNS1	1½	19½	8⅜	4⅝	5⅞	3⅜	5½	7⅞	1 13/16	1 31/32	3¾	3	125
1RVN¼	1½	16⅞	8½	4⅛	6 1/32	3⅜	3¼	7⅞	1 15/16	2	4⅜	3½	100
1RVN⅓	1½	16⅞	8½	4⅛	6 1/32	3⅜	3¼	7⅞	1 15/16	2	4⅜	3½	100
1RVN½	1½	17¾	8½	4⅛	6 1/32	3⅜	3¼	7⅞	1 15/16	2	4⅜	3½	100
1RVN¾	1½	18½	9	4⅛	5⅞	3⅜	5	7⅞	1 15/16	2	4⅜	3½	125
1RVN1	1½	19½	9	4⅝	5⅞	3⅜	5½	7⅞	1 15/16	2	4⅜	3½	150
1½RVN¼	2	17½	9⅛	4⅛	6 1/32	3⅜	3¼	7⅞	2⅞	2⅜	5	3½	100
1½RVN⅓	2	17½	9⅛	4⅛	6 1/32	3⅜	3¼	7⅞	2⅞	2⅜	5	3½	100
1½RVN½	2	18⅜	9⅛	4⅛	6 1/32	3⅜	3¼	7⅞	2⅞	2⅜	5	3½	100
1½RVN¾	2	19⅛	9⅝	4⅛	5⅞	3⅜	5	7⅞	2⅞	2⅜	5	3½	125
1½RVN1	2	20⅛	9⅝	4⅝	5⅞	3⅜	5½	7⅞	2⅞	2⅜	5	3½	175
2RVN½	3	19¼	10⅛	4⅛	6 1/32	3⅜	3¼	7⅞	3¾	2 15/16	6	3⅝	100
2RVN¾	3	20	10⅝	4⅛	5⅞	3⅜	5	7⅞	3¾	2 15/16	6	3⅝	125
2RVN1	3	21	10⅝	4⅝	5⅞	3⅜	5½	7⅞	3¾	2 15/16	6	3⅝	175

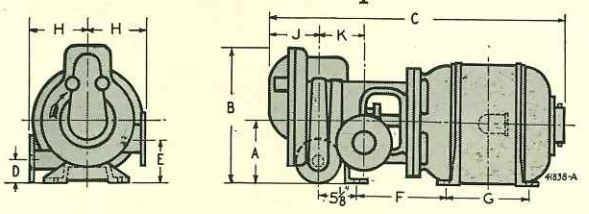
RVN, RVNL and MRVN Pumps

Integral hp. Motors

Size	Suct.	A	B	C	D	E	F	H & D	H	J	K	Shipping Wgt.
1RVN1½	1½	21½	9⅜	5	7 1/16	4	6½	—	1 15/16	2	3½	175
1RVN2	1½	22⅜	9⅞	5½	7¾	4½	6¾	—	1 15/16	2	3½	200
1RVN3	1½	22⅜	9⅞	5½	7¾	4½	6¾	—	1 15/16	2	3½	200
1RVNL1½	1½	21⅝	11¼	5	—	4	6½	10 11/16	—	1 7/16	3⅛	175
1RVNL2	1½	22⅜	11¾	5½	—	4½	6¾	10⅞	—	1 7/16	3⅛	200
1RVNL3	1½	22⅜	11¾	5½	—	4½	6¾	10⅞	—	1 7/16	3⅛	200
1RVNL5	1½	23⅛	11¾	5½	—	4½	7½	10⅞	—	1 7/16	3⅛	225
1½RVN1½	2	22⅛	10	5	7 1/16	4	6½	—	2⅞	2⅜	3½	175
1½RVN2	2	23⅛	10½	5½	7¾	4½	6¾	—	2⅞	2⅜	3½	200
1½RVN3	2	23⅛	10½	5½	7¾	4½	6¾	—	2⅞	2⅜	3½	200
1½RVN5	2	23⅞	10½	5½	7¾	4½	7½	—	2⅞	2⅜	3½	225
2RVN1½	3	23	11	5	7 1/16	4	6½	—	3¾	2 15/16	3⅝	175
2RVN2	3	24	11½	5½	7¾	4½	6¾	—	3¾	2 15/16	3⅝	200
2RVN3	3	24	11½	5½	7¾	4½	6¾	—	3¾	2 15/16	3⅝	225
2RVN5	3	24¾	11½	5½	7¾	4½	7½	—	3¾	2 15/16	3⅝	250
1MRVN1½	1½	23⅛	12	5½	8	4¼	6½	—	2 7/16	2 13/16	*4⅛	200
1MRVN2	1½	24⅛	12	5½	8 5/16	4¼	6¾	—	2 7/16	2 13/16	*4⅛	225
1MRVN3	1½	24⅛	12	5½	8 5/16	4¼	6¾	—	2 7/16	2 13/16	*4⅛	250
1MRVN5	1½	24⅞	12	5½	8 5/16	4¼	7½	—	2 7/16	2 13/16	*4⅛	275

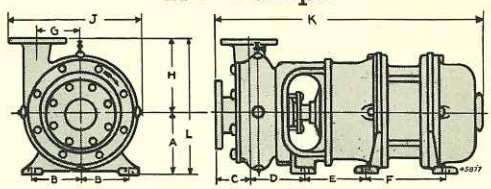
*Discharge is horizontal. Distance is that below centerline.

MRV Pumps

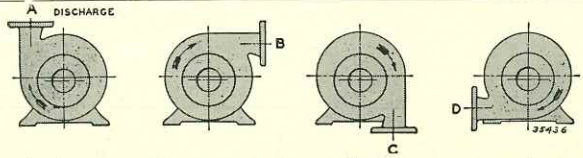


Size	Suct.	A	B	C	D	E	F	G	H	J	K	Wt. lbs.
1½MRV10	2½	7	16¼	37⅜	2⅛	4½	11⅜	9½	7½	6⅞	5¾	525
1½MRV15	2½	8	17¼	38⅝	3⅛	5½	11⅜	10½	7½	6⅞	5¾	600
1½MRV20	2½	8	17¼	40⅜	3⅛	5½	11⅝	12	7½	6⅞	5¾	675
1½MRV25	2½	9	18¼	42 1/16	4⅛	6½	13⅛	11¼	7½	6⅞	5¾	825
1½MRV30	2½	9	18¼	43 1/16	4⅛	6½	13⅛	12¼	7½	6⅞	5¾	875
2 MRV10	3	7	17⅞	40⅛	1½	4¼	11⅜	9½	8	9⅝	5⅝	500
2 MRV15	3	8	18⅞	41⅜	2½	5¼	11⅜	10½	8	9⅝	5⅝	650
2 MRV20	3	8	18⅞	43⅜	2½	5¼	11⅝	12	8	9⅝	5⅝	700
2 MRV25	3	9	19⅞	44⅞	3½	6¼	13 3/16	11¼	8	9⅝	5⅝	875
2 MRV30	3	9	19⅞	45⅞	3½	6¼	13 3/16	12¼	8	9⅝	5⅝	900
2 MRV40	3	10	20⅞	47¼	4½	7¼	13⅞	12¼	8	9⅝	5⅝	1025
2 MRV50	3	10	20⅞	48¾	4½	7¼	13⅞	13¾	8	9⅝	5⅝	1125

RV Pumps



Size Discharge Symbol hp.	Suct. Size	A	B	C	D	E	F	G	H	J	K	Shipping Weight lbs.
1½RV1	2	5	4	4	4⅝	6⅜	6½	2¾	6¼	9⅝	24¼	175
1½RV1½	2	5½	4½	4	4⅝	6⅜	6¾	2¾	6¼	9⅝	25¼	225
1½RV2	2	5½	4½	4	4⅝	6⅜	7½	2¾	6¼	9⅝	26	225
1½RV3	2	5½	4½	4	4⅝	6⅜	6¾	2¾	6¼	9⅝	25¼	225
1½RV5	2	5½	4½	4	4⅝	6⅜	7½	2¾	6¼	9⅝	26	250
1½RVH1	2½	5	4	4	4⅝	6⅜	6½	4½	6½	12⅝	24¼	225
1½RVH1½	2½	5½	4½	4	4⅝	6⅜	6¾	4½	6½	12⅝	25¼	250
1½RVH2	2½	5½	4½	4	4⅝	6⅜	7½	4½	6½	12⅝	26	275
1½RVH3	2½	5½	4½	4	4⅝	6⅜	7½	4½	6½	12⅝	26	275
1½RVH5	2½	6¼	5	4	5	6⅜	8¼	4½	6½	12⅝	28	300
1½RVH7½	2½	7	5½	4	5	7	9½	4½	6½	12⅝	30	325
1½RVH10	2½	8	6¼	4	5	7½	10½	4½	6½	12⅝	31¾	400
1½RVH15	2½	8	6¼	4	4⅞	7½	10½	4½	6½	12⅝	31¾	475
1½RVL1	2	5	4	4⅜	4 9/16	6¼	6½	5⅜	6¾	14⅛	23⅛	250
1½RVL1½	2	5½	4½	4⅜	4 9/16	6 9/16	6¾	5⅜	6¾	14⅛	24½	275
1½RVL2	2	5½	4½	4⅜	4 9/16	6 9/16	7½	5⅜	6¾	14⅛	26⅜	300
1½RVL3	2	5½	4½	4⅜	4 9/16	6 9/16	7½	5⅜	6¾	14⅛	26⅜	300
1½RVL5	2	6¼	5	4⅜	4 9/16	6⅝	8¼	5⅜	6¾	14⅛	27 15/16	325
2RV1	3	5	4	4½	4½	6⅜	6½	3⅝	6½	11⅝	24⅜	200
2RV1½	3	5½	4½	4⅜	4½	6⅝	6¾	3⅝	6½	11⅝	25⅜	250
2RV2	3	5½	4½	4⅜	4½	6⅝	7½	3⅝	6½	11⅝	26⅜	250
2RV3	3	5½	4½	4⅜	4½	6⅝	6¾	3⅝	6½	11⅝	25⅜	250
2RV5	3	5½	4½	4⅜	4½	6⅝	7½	3⅝	6½	11⅝	26⅜	275
2RV7½	3	6¼	5	4⅜	5	6⅝	8¼	3⅝	6½	11⅝	28⅛	325
2RVH1	3	5	4	4½	4½	6⅜	6½	4¾	7¾	13⅜	26½	225
2RVH1½	3	5½	4½	4⅜	4½	6⅝	6¾	4¾	7¾	13⅜	27⅛	275
2RVH2	3	5½	4½	4⅜	4½	6⅝	6¾	4¾	7¾	13⅜	27⅛	275
2RVH3	3	5½	4½	4⅜	4½	6⅝	6¾	4¾	7¾	13⅜	27⅛	275
2RVH5	3	5½	4½	4⅜	4½	6⅝	7½	4¾	7¾	13⅜	26⅛	300
2RVH7½	3	6¼	5	4⅜	5	6⅝	8¼	4¾	7¾	13⅜	28⅛	350
2RVH10	3	7	5½	4⅜	4⅞	7	9½	4¾	7¾	14⅞	30⅛	400
2RVH15	3	8	6¼	4⅜	4⅞	7½	10½	4¾	7¾	14⅞	31⅞	500
2RVH20	3	8	6¼	4⅜	4⅞	7¾	12	4¾	7¾	14⅞	33⅞	550
2RVL3	3	5½	4½	5	5⅞	6 3/16	7½	6½	8	16½	28 5/16	400
2RVL5	3	6¼	5	5	5⅞	7 5/16	8¼	6½	8	16½	29⅞	375
2RVL7½	3	7	5½	5	5⅞	7⅜	9½	6½	8	16½	32⅜	475
2RVL10	3	8	6¼	5	5⅞	7⅞	10½	6½	8	16½	34⅛	550
3RVS1	4	5	4	4¼	5⅜	6¼	6½	4¼	6½	13	24½	225
3RVS1½	4	5½	4½	4¼	5⅜	6⅝	6¾	4¼	6½	13	25½	275
3RVS2	4	5½	4½	4¼	5⅜	6⅝	7½	4¼	6½	13	26¼	275
3RVS3	4	5½	4½	4¼	5⅜	6⅝	6¾	4¼	6½	13	25½	275
3RVS5	4	5½	4½	4¼	5⅜	6⅝	7½	4¼	6½	13	26¼	300
3RVS7½	4	6¼	5	4¼	5⅜	6⅝	8¼	4¼	6½	13	28¼	350
3RVS10	4	7	5½	4¼	5⅝	9½	9½	3⅞	6½	13	30¼	400
3RVL1½	4	5½	4½	5½	5⅝	7	6¾	5½	9½	17¼	28¼	325
3RVL2	4	5½	4½	5½	5⅝	7	7½	5½	9½	17¼	29	350
3RVL3	4	5½	4½	5½	5⅝	7	7½	5½	9½	17¼	29	425
3RVL5	4	7	5½	5½	6	7⅜	9½	5½	9½	17¼	33	475
3RVL7½	4	8	6¼	5½	6	7⅞	10½	5½	9½	17¼	34¾	475
3RVL10	4	8	6¼	5½	6	7⅞	10½	5½	9½	17¼	34¾	550
3RVL15	4	8	6¼	5½	6	8⅛	12	5½	9½	17¼	36¾	625
3RVL20	4	9	7	5½	5⅜	8⅝	11¼	5½	9½	17¼	36⅜	775
3RVH2	4	5½	4½	5½	6	6 3/16	7½	5½	8	15⅝	28 5/16	325
3RVH3	4	5½	4½	5½	6	6 3/16	7½	5½	8	15⅝	28 5/16	350
3RVH5	4	6¼	5	5½	6	6⅝	8¼	5½	8	15⅝	30½	375
3RVH10	4	7	5½	5½	6	7⅜	9½	5½	8	15⅝	33	450
3RVH15	4	8	6¼	5½	6	8⅛	12	5½	8	16⅜	36¾	550
3RVH20	4	8	6¼	5½	6	8⅛	12	5½	8	16⅜	36¾	625
3RVH25	4	9	7	5½	5⅜	8⅝	11¼	5½	8	16⅜	36⅜	775
3RVH30	4	10	7	5½	5⅜	8⅝	12¼	5½	8	18¼	37⅜	800
3RVH40	4	11	8	5½	5⅛	9⅝	12¼	5½	8	18¼	38⅞	925
4RVL3	5	5½	4½	6	5⅝	7	7½	6⅜	10⅛	19¼	29½	450
4RVL5	5	7	5½	6	6	7⅜	9½	6⅜	10⅛	19¼	33½	525
4RVL7½	5	8	6¼	6	6	7⅞	10½	6⅜	10⅛	19¼	35¼	600
4RVL10	5	8	6¼	6	6	8⅛	12	6⅜	10⅛	19¼	37¼	650
4RVL15	5	8	6¼	6	6	8⅛	12	6⅜	10⅛	19¼	37¼	650
4RVL20	5	9	7	6	5⅜	8⅝	11¼	6⅜	10⅛	21⅞	36⅞	825
4RVL25	5	9	7	6	5⅜	8⅝	12¼	6⅜	10⅛	20	37⅞	850
4RVL30	5	10	8	6	5⅛	9⅝	13¾	6⅜	10⅛	20	40⅞	1050
5RVL40	6	11	9	6 3/16	5 7/16	10 7/16	14½	8⅛	8¼	23⅞	45⅞	1250



The discharge on all except the 4 and 5RVL pumps may be turned in the four positions shown. The 4 and 5RVL can not be turned to position "C" and the 5RVL cannot be turned to position "D" with some motors. "A" position shipped unless otherwise specified.

60 Cycle Performance--Closed Impeller

U.S. Gals. per Min.	TOTAL HEAD IN FEET													U.S. Gals. per Min.
	15	20	25	30	40	50	60	70	80	90	100	125	150	
5 10 15	*IRVNS¼* *IRVNS¼* *IRVNS¼*	*IRVN¼* *IRVN¼* *IRVN¼*	*IRVN¼* *IRVN¼* *IRVN¼*	*IRVN¼* *IRVN¼* *IRVN¼*	*IRVNS½* *IRVNS½* *IRVNS½*	*IRVNS½* *IRVNS½* *IRVNS½*	*IRVNS¾* *IRVNS¾* *IRVNS¾*	*IRVNS¾* *IRVNS¾* *IRVNS¾*	*IRVNS1* *IRVNS1* *IRVNS1*	*IRVN1* *IRVN1* *IRVN1½*	*IRVN1½* *IRVN1½* *IRVN1½*	*IRVNL1½* *IRVNL1½* *IRVNL2*	*IRVNL2* *IMRVN2* *IMRVN2*	5 10 15
20 30 40	*IRVNS¼* *IRVNS¼* *IRVNS½*	*IRVN¼* *IRVN⅓* *IRVNS½*	*IRVN¼* *IRVNS⅓* *IRVNS½*	*IRVNS⅓* *IRVNS½* *IRVNS½*	*IRVNS½* *IRVNS½* *IRVNS¾*	*IRVNS½* *IRVNS¾* *IRVNS¾*	*IRVNS¾* *IRVNS¾* *IRVNS1*	*IRVNS¾* *IRVNS1* *IRVN1½*	*IRVN1* *IRVN1½* *IRVN1½*	*IRVN1½* *IRVN1½* *IRVN2*	*IRVN1½* *IRVN1½* *IRVN2*	*IRVNL2* *IRVNL2* *IRVNL3*	*IMRVN2* *IMRVN3* *IMRVN5*	20 30 40
50	*IRVN½* 1½RV1	*IRVN½* 1½RV1	*IRVNS½* 1½RV1	*IRVNS¾* 1½RV1½	*IRVNS¾* 1½RV1½	*IRVNS1* 1½RV1½	*IRVN1½* 1½RV1½	*IRVN1½* 1½RV1½	*IRVN2* 1½RV2	*IRVN2* 1½RV2	*IRVN3* 1½RV3	*IRVNL3* 1½RV3	*IMRVN5* 1½RVH5	50
60	*IRVN¾* 1½RV1	*IRVN¾* 1½RV1	*IRVN¾* 1½RV1	*IRVN1* 1½RV1½	*IRVN1* 1½RV1½	*IRVN1½* 1½RV1½	*IRVN1½* 1½RV1½	*IRVN2* 1½RV2	*IRVN2* 1½RV2	*IRVN3* 1½RV3	*IRVN3* 1½RV3	1½RVH5	1½RVH5	60
75	*1½RVN½* 1½RV1	*1½RVN¾* 1½RV1	*1½RVN¾* 1½RV1	*1½RVN1* 1½RV1½	*1½RVN1½* 1½RV1½	*1½RVN2* 1½RV1½	*1½RVN2* 1½RV2	*1½RVN3* 1½RV2	*1½RVN3* 1½RV3	*1½RVN3* 1½RV3	*1½RVN5* 1½RV3	1½RVH5	1½RVH5	75
100	*1½RVN¾* 2RV1	*1½RVN¾* 2RV1	*1½RVN1* 2RV1	*1½RVN1½* 1½RV1½	*1½RVN1½* 1½RV1½	*1½RVN2* 1½RV2	*1½RVN3* 1½RV3	*1½RVN3* 1½RV3	*1½RVN3* 1½RV3	*1½RVN5* 1½RV5	*1½RVN5* 1½RV5	1½RVH5	1½RVH7½	100
125	*2RVN¾* 2RV1	*2RVN1* 2RV1	*2RVN1* 1½RV1½	*1½RVN1½* 1½RV2	*1½RVN2* 1½RV2	*1½RVN3* 1½RV3	*1½RVN3* 1½RV3	*1½RVN5* 1½RV5	*1½RVN5* 1½RV5	*1½RVN5* 1½RV5	*1½RVN5* 1½RV5	1½RVH7½	1½RVH7½	125
150	3RVS1	*1½RVN1½* 3RVS1½	*1½RVN2* 2RV2	*1½RVN2* 2RV2	*1½RVN3* 2RV2	*1½RVN3* 2RV3	*1½RVN5* 2RV3	*1½RVN5* 2RV5	*1½RVN5* 2RV5	*1½RVN5* 2RV5	2RV7½	1½RVH7½a	1½RVH10a	150
175	3RVS1	*1½RVN2* 3RVS1½	*2RVN2* 2RV2	*2RVN2* 2RV2	*2RVN3* 2RV3	*2RVN5* 2RV3	*2RVN5* 2RV5	*2RVN5* 2RV5	*2RVN5* 2RV5	*2RVN5* 2RV5	2RV7½	2RVH7½	2RVH10	175
200	3RVS1½	3RVS1½	2RV3	*2RVN3* 2RV3	*2RVN3* 2RV3	*2RVN5* 2RV5	*2RVN5* 2RV5	*2RVN5* 2RV5	2RV5	2RV7½	2RV7½	2RVH10	2RVH15	200
225	3RVS1½	3RVS1½	3RVS3	2RV3	*1½RVN5* 2RV5	*2RVN5* 2RV5	*2RVN5* 2RV5	2RV5	2RV7½	2RV7½	2RV7½	2RVH10	2RVH15	225
250	3RVS1½	3RVS2	3RVS3	3RVS5	*2RVN5* 2RV5	*2RVN5* 2RV5	2RV7½	2RV7½	2RV7½	2RV7½	2RVH10	2RVH15	2RVH15	250
300 350 400	3RVS2 3RVL2 3RVL3	3RVS3 3RVH3 3RVL3	3RVS3 3RVS5 3RVS5	3RVS5 3RVS5 3RVS5	3RVS5 3RVS5 3RVS7½	3RVS5 3RVS7½ 3RVS7½	3RVS7½ 3RVS7½ 3RVS10	3RVS7½ 3RVS10 3RVS10	3RVS10 3RVS10 3RVS10	3RVS10 3RVS10 3RVL15	3RVL15 3RVL15 3RVL15	2RVH15 3RVHS15 3RVH20	2RVH20 2RVH20a 3RVH20	300 350 400
450 500 550	3RVL3	3RVL5 3RVL5 4RVL5	3RVL5 3RVL5 4RVL5	3RVL5 3RVL7½ 3RVL7½	3RVL7½ 3RVL7½ 3RVL10	3RVS10a 3RVL10 3RVL10	3RVS10 3RVL10 3RVL15	3RVL10 3RVL15 3RVL15	3RVL15 3RVL15 3RVL15	3RVL15 3RVL15 3RVL20	3RVL15 3RVL20 3RVL20	3RVH20 3RVH25 4RVL25	3RVH25 3RVH25 3RVH30a	450 500 550
600 700 800		4RVL5 4RVL7½	4RVL5 4RVL7½ 4RVL7½	4RVL7½ 4RVL7½ 4RVL10	4RVL7½ 4RVL10 4RVL15	4RVL10 4RVL15 4RVL15	4RVL15 4RVL15 4RVL20	4RVL15 4RVL20 4RVL20	4RVL20 4RVL20 4RVL20	4RVL20 4RVL20 4RVL25	4RVL20 4RVL25 4RVL25	4RVL25		600 700 800
900 1000 1100				4RVL15	4RVL15 5RVL15	4RVL20 4RVL20	4RVL20 4RVL25 5RVL25	4RVL25 4RVL25 5RVL30	4RVL25 4RVL30 5RVL30	4RVL30 4RVL30 5RVL40	4RVL30 4RVL30 5RVL40			900 1000 1100
1250 1400								5RVL30 5RVL40	5RVL40 5RVL40	5RVL40 5RVL40	5RVL40			1250 1400

U.S. Gals. per Min.	TOTAL HEAD IN FEET													U.S. Gals. per Min.
	175	200	225	250	275	300	325	350	375	400	425	450	500	
5 10 15	*IMRVN2* *IMRVN2* *IMRVN3*	*IMRVN2* *IMRVN3* *IMRVN3*	*IMRVN3* *IMRVN3* *IMRVN3*	*IMRVN3* *IMRVN3* *IMRVN5*										5 10 15
20 30 40	*IMRVN3* *IMRVN5* *IMRVN5*	*IMRVN3* *IMRVN5* *IMRVN5*	*IMRVN5* *IMRVN5* 1½RVH7½	1½MRV10 1½MRV10 1½MRV10	1½MRV10 1½MRV10 1½MRV10	1½MRV10 1½MRV10 1½MRV10	1½MRV10 1½MRV10 1½MRV10	1½MRV10 1½MRV10 1½MRV10	1½MRV10 1½MRV10 1½MRV15	1½MRV10 1½MRV15 1½MRV15	1½MRV15 1½MRV15 1½MRV15	1½MRV15 1½MRV15 1½MRV15	1½MRV15 1½MRV15 1½MRV20	20 30 40
50	*IMRVN5* 1½RVH5	1½RVH7½	1½RVH7½	1½RVH10	1½MRV10	1½MRV10	1½MRV10	1½MRV15	1½MRV15	1½MRV15	1½MRV15	1½MRV15	1½MRV20	50
75 100 125	1½RVH7½ 1½RVH7½ 1½RVH10	1½RVH7½ 1½RVH10 1½RVH10	1½RVH10 1½RVH10 1½RVH15	1½RVH15 1½RVH15 1½MRV15a	1½MRV10 1½MRV15 1½MRV15a	1½MRV15 1½MRV15 1½MRV20a	1½MRV15 1½MRV15 1½MRV20a	1½MRV15 1½MRV20 1½MRV20a	1½MRV15 1½MRV20 1½MRV20a	1½MRV15 1½MRV20 1½MRV25a	1½MRV20 1½MRV20 1½MRV25a	1½MRV20 1½MRV25 1½MRV25a	1½MRV20 1½MRV25 1½MRV30a	75 100 125
150 175 200	1½RVH15a 2RVH15 2RVH15	1½RVH15a 2RVH15 2RVH15	1½RVH15a 2RVH15 2RVH20	2RVH20 2RVH20 2RVH20	2MRV20 2RVH20 2MRV25	2MRV20 2MRV25 2MRV25	2MRV20 2MRV25 2MRV25	2MRV25 2MRV25 2MRV30	2MRV25 2MRV30 2MRV30	2MRV25 2MRV30 2MRV40	2MRV30 2MRV30 2MRV40	2MRV30 2MRV40 2MRV40	2MRV40 2MRV40 2MRV40	150 175 200
225 250 300	2RVH15 2RVH15 2RVH20	2RVH20 2RVH20 3RVHS25	2RVH20 2RVH20 3RVHS25	2RVH20 2MRV25	2MRV25 2MRV30	2MRV30 2MRV30	2MRV30 2MRV40	2MRV30 2MRV40	2MRV40 2MRV40	2MRV40 2MRV40	2MRV40 2MRV40	2MRV40		225 250 300
350 400 450	3RVHS20 3RVH25 3RVH25	3RVHS25 3RVH30 3RVH30	3RVHS30 3RVH30 3RVH40											350 400 450
500 550	3RVH30 3RVH40a	3RVH40 3RVH40a	3RVH40											500 550

Based on clear, cold water with 15 ft. suction lift except those marked "a" which are based on 10 ft. lift.
Selections in italics (such as *IRVN¼*) are standard line Motorpumps.
Selections in regular type (such as 1½RV1) are heavy-duty line Motorpumps.
Selections with letter "M" in the symbol (such as *IMRVN2* and 1½MRV10) are 2-stage Motorpumps.

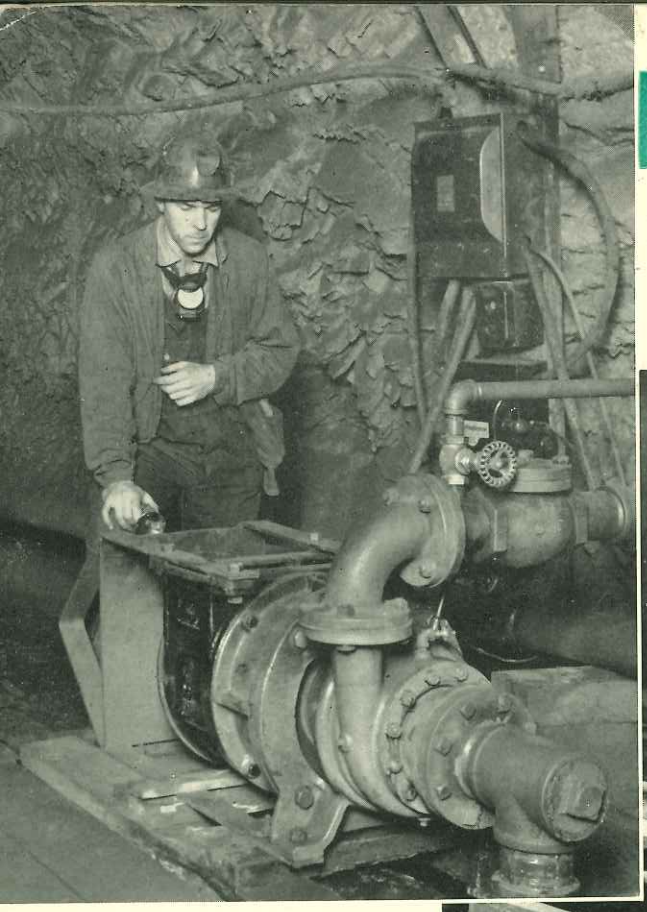
50 Cycle Performance--Closed Impeller

U. S. Gals. per Min.	TOTAL HEAD IN FEET												U. S. Gals. per Min.
	15	20	25	30	40	50	60	70	80	90	100	110	
5 10 15	*1RVN1¼* *1RVN1¼* *1RVN1¼*	*1RVN1¼* *1RVNS1¼* *1RVNS1¼*	*1RVNS1¼* *1RVNS1¼* *1RVNS1¼*	*1RVNS1¼* *1RVNS1¼* *1RVNS1¼*	*1RVNS1½* *1RVNS1½* *1RVNS1½*	*1RVNS1½* *1RVNS1½* *1RVNS1½*	*1RVN1½* *1RVN1½* *1RVN¾*	*1RVN¾* *1RVN¾* *1RVN¾*	*1RVNL1* *1RVNL1* *1RVNL1*	*1RVNL1* *1RVNL1* *1RVNL1*	*1RVNL1½* *1RVNL1½* *1RVNL1½*	*1MRVN1* *1MRVN1½* *1MRVN1½*	5 10 15
20 30 40	*1RVN1¼* *1RVN1¼* *1RVNS1½*	*1RVNS1¼* *1RVNS1¼* *1RVNS1½*	*1RVNS1¼* *1RVNS1½* *1RVNS1½*	*1RVNS1½* *1RVNS1½* *1RVNS1½*	*1RVNS1½* *1RVNS1½* *1RVNS¾*	*1RVNS1½* *1RVNS¾* *1RVN1*	*1RVN¾* *1RVN1* *1RVN1½*	*1RVN1* *1RVN1* *1RVN1½*	*1RVN1½* *1RVNL1½* *1RVNL1½*	*1RVNL1½* *1RVNL1½* *1RVNL2*	*1RVNL1½* *1MRVN2* *1MRVN3*	*1MRVN1½* *1MRVN2* *1MRVN3*	20 30 40
50	*1RVN1½*	*1RVNS1½* 1½RVH1	*1RVNS1½* 1½RVH1	*1RVNS¾* 1½RVH1	*1RVNS¾* 1½RV1½	*1RVN1* 1½RV1½	*1RVN1½* 1½RV1½	*1RVNL1½* 1½RV1½	*1RVNL2* 1½RV2	*1MRVN3* 1½RVH3	*1MRVN3* 1½RVH3	*1MRVN5* 1½RVH3	50
60	*1RVN¾*	*1RVN¾* 1½RVH1	*1RVN¾* 1½RVH1	*1RVN1* 1½RVH1	*1RVN1½* 1½RV1½	*1RVN1½* 1½RV1½	*1RVN1½* 1½RV1½	*1RVNL2* 1½RV2	*1½RVN3* 1½RVH3	*2RVN3* 1½RVH3	1½RVH3	1½RVH5	60
75	*1½RVN1½*	*1½RVN¾* 1½RVH1	*1½RVN¾* 1½RVH1	*1½RVN1* 1½RV1½	*1½RVN1½* 1½RV1½	*1½RVN1½* 1½RV1½	*1½RVN2* 1½RV2	*2RVN3* 1½RV2	*1½RVN3* 1½RVH3	1½RVH3	1½RVH5	1½RVH5	75
100	*2RVN1½*	*1½RVN1* 1½RVH1	*1½RVN1* 1½RVH1	*1½RVN1½* 1½RV1½	*1½RVN1½* 1½RV1½	*1½RVN2* 1½RV2	*1½RVN3* 1½RV3	*1½RVN3* 1½RV3	*2RVN3* 2RV3	1½RVH5	1½RVH5	1½RVH5	100
125	*1½RVN1*	*1½RVN1½* 2RV1½	*1½RVN1½* 2RV1½	*1½RVN1½* 2RV1½	*2RVN2* 2RV2	*2RVN3* 2RV2	*2RVN3* 2RV3	*2RVN3* 2RV3	*2RVN5* 1½RVH5	1½RVH5	1½RVH5	1½RVH7½	125
150	*1½RVN1½*	*1½RVN1½* 2RV1½	*1½RVN2* 2RV1½	*1½RVN2* 2RV1½	*2RVN2* 2RV2	*2RVN3* 2RV3	*2RVN3* 2RV3	*2RVN5* 2RV5	*2RVN5* 1½RVH5	1½RVH5	1½RVH7½	1½RVH7½	150
175	2RV1½	*1½RVN2* 2RV1½	*2RVN2* 2RV2	*2RVN2* 2RV2	*2RVN3* 2RV3	*2RVN3* 2RV3	*2RVN5* 2RV5	*2RVN5* 2RV5	2RVH5	2RVH7½	2RVH7½	2RVH7½	175
200	3RVH1½	3RVH1½	*2RVN2* 2RV2	*2RVN3* 2RV3	*2RVN3* 2RV3	*2RVN5* 2RV5	*2RVN5* 2RV5	*2RVN5* 2RVH5	2RVH7½	2RVH7½	2RVH7½	2RVH7½	200
225	3RVH1½	3RVH2	3RVS3	*2RVN3* 2RV3	*2RVN5* 3RVS3	*2RVN5* 2RV5	*2RVN5* 2RVH5a	2RVH7½	2RVH7½	2RVH7½	2RVH10	2RVH10	225
250	3RVH1½	3RVH2	3RVS3	*2RVN5* 3RVS3	*2RVN5* 3RVS5	*2RVN5* 3RVS5	*2RVN5* 3RVS5	3RVL7½	2RVH7½	2RVH10	2RVH10	2RVH10	250
300 350 400	3RVL2 3RVL3 3RVL3	3RVS3 3RVL3 3RVL3	3RVS3 3RVL5 3RVL5	3RVS5 3RVS5 3RVL5	3RVS5 3RVS5 3RVL7½	3RVS5 3RVS7½ 3RVL7½	3RVS7½ 3RVL7½ 3RVL7½	3RVL7½ 3RVL10 3RVL10	3RVL10 3RVHS10 3RVH15	2RVH10 3RVHS15 3RVH15	2RVH15 3RVHS15 3RVH15	2RVH15 3RVHS15 3RVH15	300 350 400
450 500 550	3RVL3 4RVL3	3RVL5 4RVL5 4RVL5	3RVL5 4RVL5 4RVL5	3RVL5 4RVL5 4RVL7½	3RVL7½ 3RVL7½ 4RVL7½	3RVL7½ 3RVL10 4RVL10	3RVL10 3RVL10 4RVL15	3RVL15 3RVL15 4RVL15	3RVH15 4RVL15 4RVL15	3RVH15 3RVH15	3RVH15 3RVH15	3RVH20 3RVH20	450 500 550
600 700 800		4RVL5	4RVL5 4RVL7½	4RVL7½ 4RVL7½ 4RVL10	4RVL10 4RVL10 4RVL15	4RVL10 4RVL15 4RVL15	4RVL15 4RVL15 4RVL15	4RVL15 4RVL15 4RVL20	4RVL15 5RVL20 5RVL20				600 700 800
900 1000 1100					4RVL15 5RVL15 5RVL15	4RVL15 4RVL20 5RVL20	4RVL20 4RVL20 5RVL20	5RVL20 5RVL25 5RVL25					900 1000 1100
1250						5RVL20	5RVL20						1250

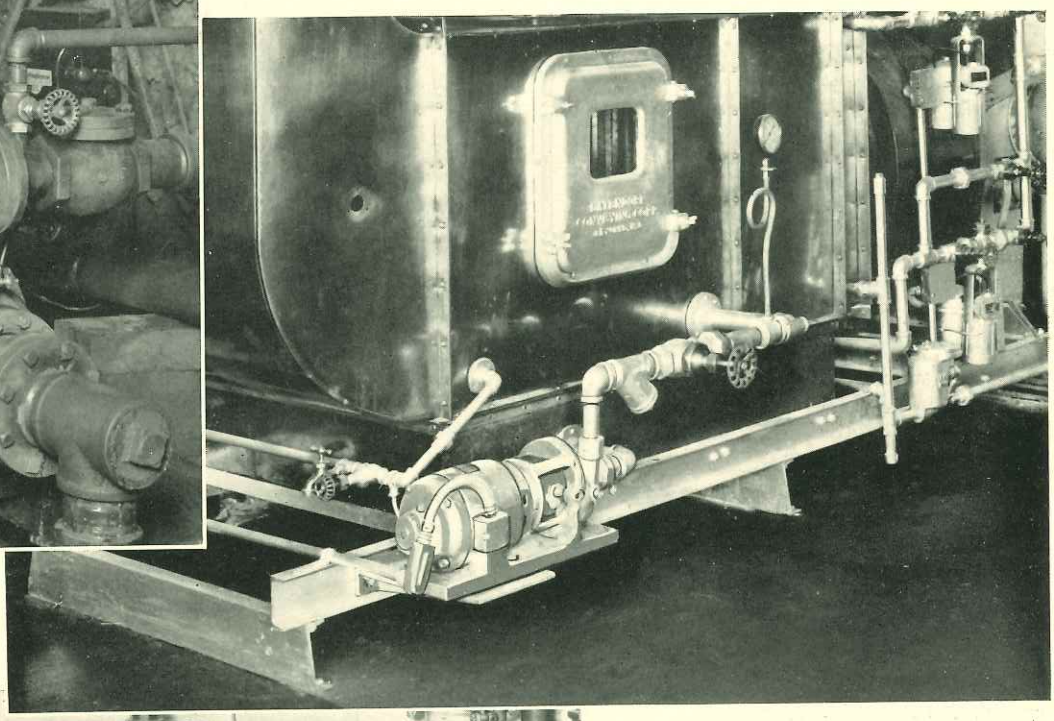
U. S. Gals. per Min.	TOTAL HEAD IN FEET												U. S. Gals. per Min.
	125	150	175	180	200	229	240	260	280	300	325	350	
5 10 15	*1MRVN1½* *1MRVN1½* *1MRVN1½*	*1MRVN1½* *1MRVN2* *1MRVN2*	*1MRVN2* *1MRVN2* *1MRVN3*	*1MRVN2* *1MRVN2* *1MRVN3*	*1MRVN2* *1MRVN3* *1MRVN3*	*1MRVN3*							5 10 15
20	*1MRVN2* 1½RVH3	*1MRVN2* 1½RVH5	*1MRVN3*	*1MRVN3* 1½MRV10	*1MRVN3* 1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	20
30	*1MRVN3* 1½RVH3	*1MRVN3* 1½RVH5	*1MRVN3*	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	30
40	*1MRVN3* 1½RVH5	*1MRVN5* 1½RVH5	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	40
50	*1MRVN5* 1½RVH5	*1MRVN5* 1½RVH5	1½RVH7½	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV10	1½MRV15	1½MRV15	50
75 100 125	1½RVH5 1½RVH5 1½RVH7½	1½RVH5 1½RVH7½ 1½RVH7½	1½RVH7½ 2RVH10 2RVH10	1½MRV10 1½MRV10 2MRV10	1½MRV10 1½MRV10 2MRV15	1½MRV10 1½MRV10 2MRV15	1½MRV10 1½MRV15 2MRV15	1½MRV10 1½MRV15 2MRV15	1½MRV10 1½MRV15 2MRV20	1½MRV15 1½MRV15 2MRV20	1½MRV15 1½MRV15 2MRV20	1½MRV15 1½MRV20 2MRV20	75 100 125
150 175 200	1½RVH7½ 2RVH7½ 2RVH10	1½RVH10 2RVH10 2RVH15	2RVH10 3RVH15 3RVH15	2MRV15 2MRV15 2MRV15	2MRV15 2MRV15 2MRV20	2MRV15 2MRV15 2MRV20	2MRV15 2MRV20 2MRV20	2MRV15 2MRV20 2MRV20	2MRV20 2MRV20 2MRV25	2MRV20 2MRV20 2MRV25	2MRV20 2MRV25 2MRV25	2MRV25	150 175 200
225 250 300	2RVH10 2RVH15 2RVH15	2RVH15 2RVH15 2RVH15	2MRV20 2MRV20	2MRV20 2MRV20	2MRV20 2MRV25	2MRV20 2MRV25	2MRV25 2MRV25	2MRV25 2MRV30	2MRV25 2MRV30	2MRV25			225 250 300
350 400 450 500	3RVHS15 3RVH20 3RVH20 3RVH20	3RVHS20 3RVH20 3RVH25 3RVH25											350 400 450 500

Based on clear cold water with 15 ft. suction lift except those marked "a" which are based on 10 ft. lift.
Selections in italics (such as *1RVN1¼*) are standard line Motorpumps.
Selections in regular type (such as 1½RVH1) are heavy-duty line Motorpumps.
Selections with letter "M" in the symbol (such as *1MRVN2* and 1½MRV10) are 2-stage Motorpumps.

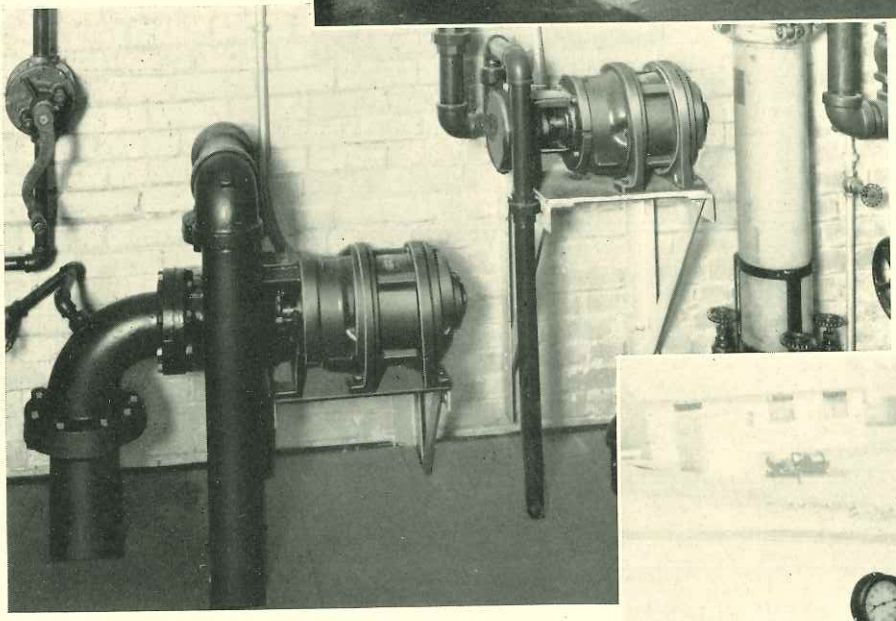
Motorpump Install



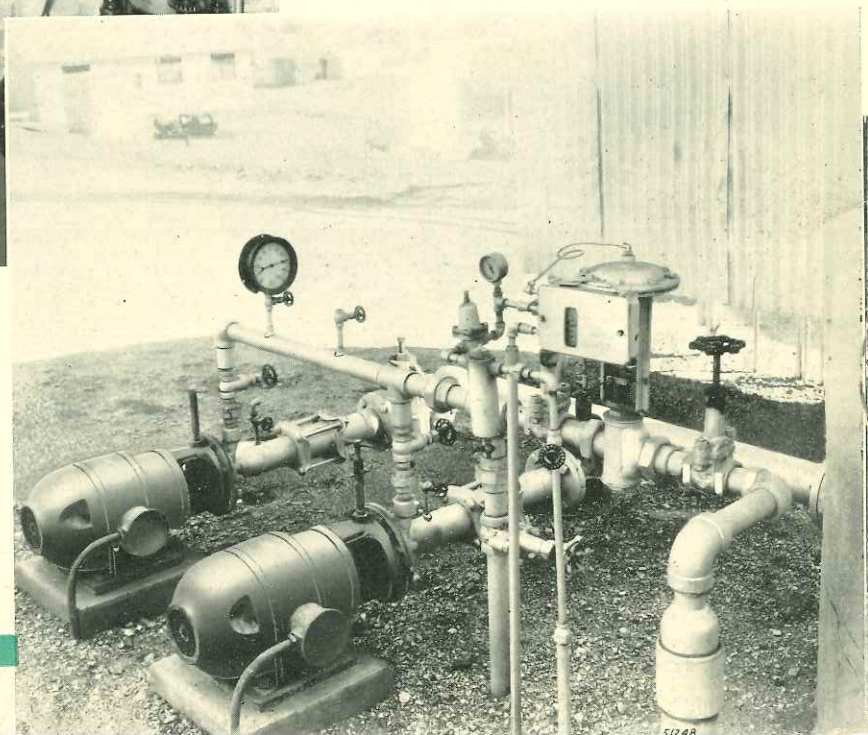
Motorpump handling mine water. This unit has a sling yoke mounting so that it may also be used for shaft dewatering.



Motorpump serving humidifying unit for conditioning a proof box in a bakery.



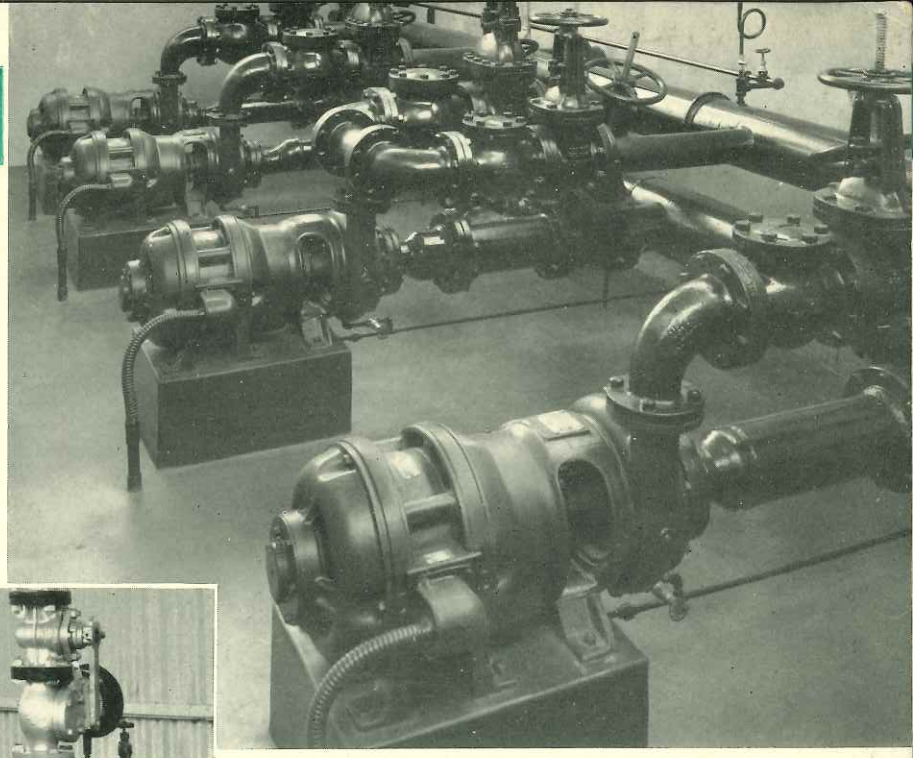
Motorpumps handling cooling water for two Ingersoll-Rand Diesel engines in a textile mill.



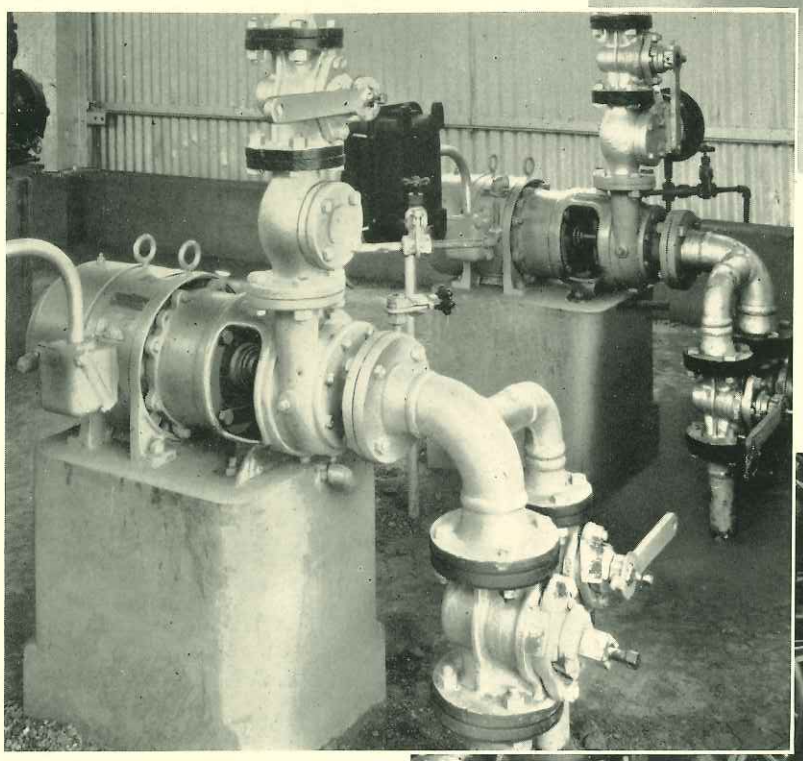
Two Motorpumps handling gasoline at a bulk distributing station.

ations Everywhere

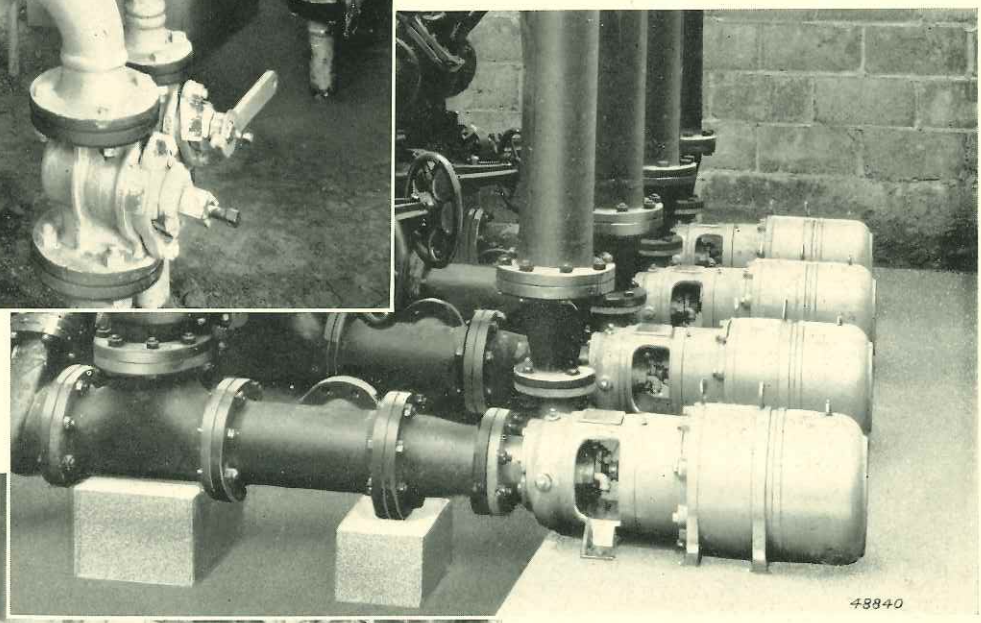
Motorpumps handling cooling water for compressors in a gas distribution station.

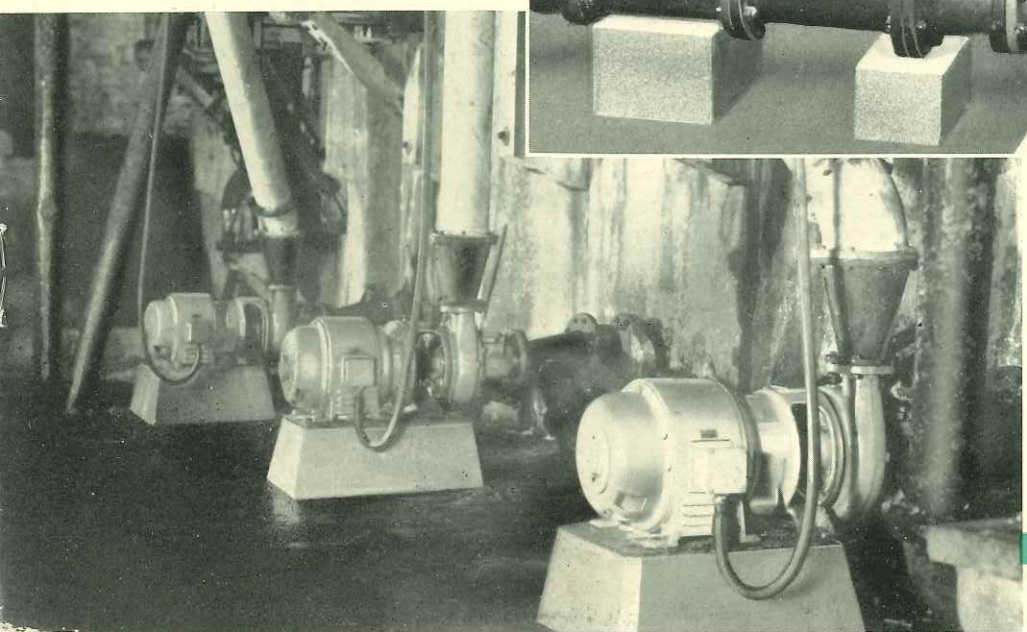


Two Motorpumps handling reflux liquid in a refinery.



Four Motorpumps handling gasoline and oil in a bulk distributing station.

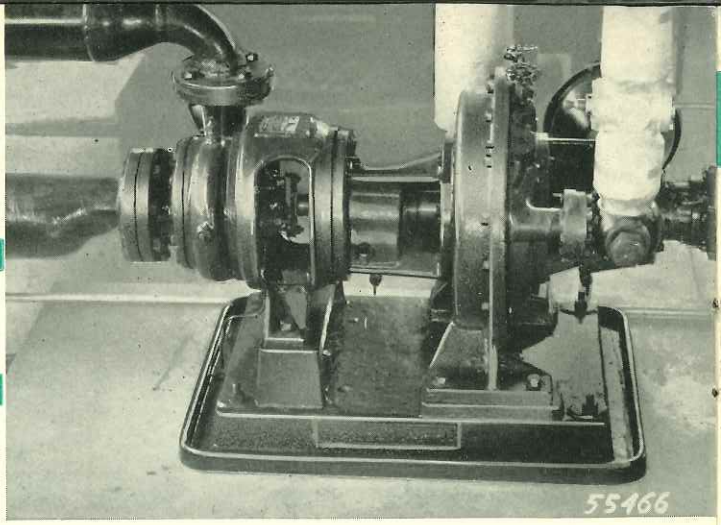




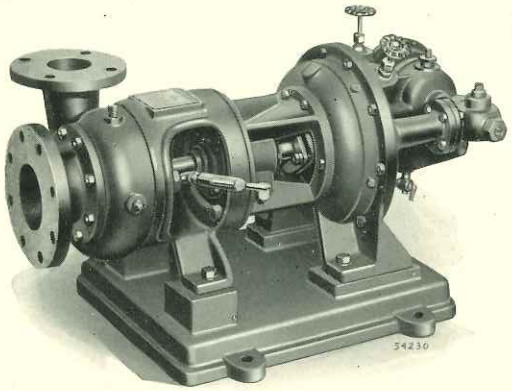
Three open impeller motor pumps handling 4% stock in a paper mill.

Close-Coupled Turbine-Driven Pumps

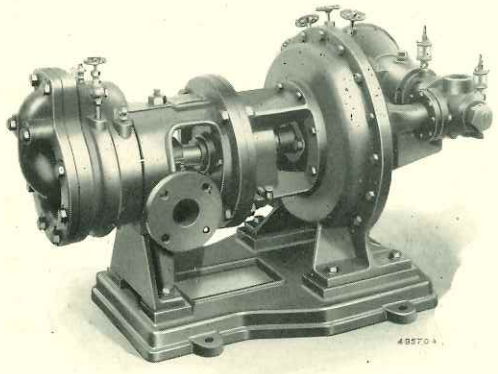
Classes TRV and TMRV



Single-stage, Class TRV unit installed in a refinery.



Single-stage, Class TRV, pump.



Two-stage, Class TMRV, pump.

These units are complete, self-contained, turbine-driven pumping units having the pump impeller and turbine wheel mounted on a common shaft.

The same pump casings and fittings are used as for the Motorpumps described on the preceding pages. They are available in practically all of the heavy-duty sizes described on page 4.

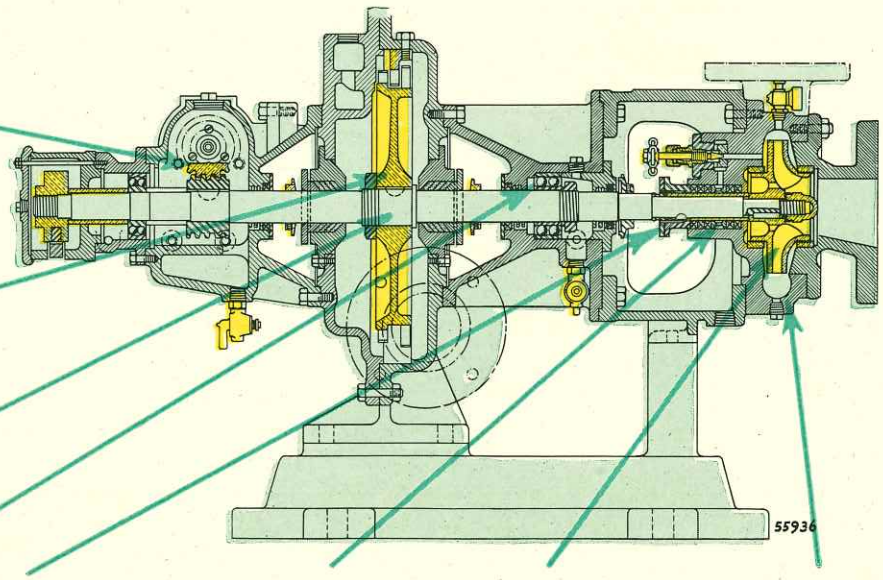
For single-stage units (Classes TRV and TRVNL) capacities range from 5 to 1400 gals. per min. against heads to 240 ft. For two-stage units (Classes TMRV and TMRVN) capacities range from 20 to 275 gals. per min. against heads to 550 ft.

The steam turbine is of a type particularly suited for pump drive. Separate valves control the steam inlet nozzles, thus allowing exact control of the power output of the turbine. The governor is of the constant speed, centrifugal flyweight type designed for exacting service and close regulation.

Governor
The governor is of slow-speed flyball type for exacting service. It is lubricated by sight feed oilers supplemented by an effective splash system.

Turbine
The turbine is particularly suited for pump service and turbine wheel is of two-row velocity-stage type.

Shaft
The shaft is extra-heavy and is completely covered within the pump by the impeller and shaft sleeve.



Bearings
The bearings are of deep-groove, oil-lubricated type and are mounted in dust-tight housings.

Glands
Stuffing box glands are of the split type, and are easily removed from the shaft.

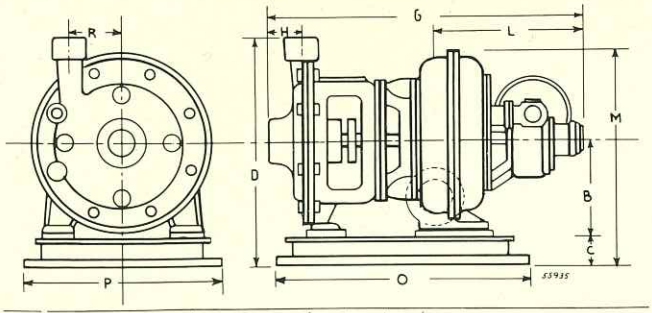
Stuffing Box
The stuffing box is extra deep and contains 5 or more rings of packing and a sealing gland.

Impeller
The impeller is of the latest hydraulic design and is carefully balanced.

Casing
The casing is vertically split and has short, carefully designed water passages.

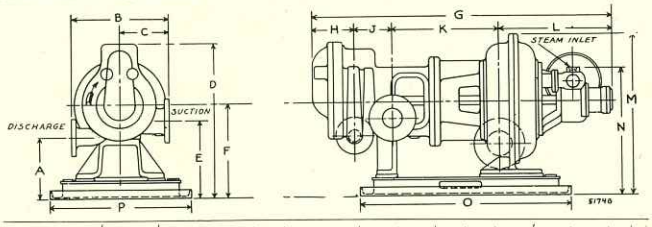
Approximate TRV Dimensions

TRVN and TMRVN Units



Size	Pump		Turbine		B	C	D	G	H	L	M	O	P	R
	Suct.	Disch.	Inlet	Exh.										
1-TRVNL9	1½	1	¾	2	7½	3¾	15⅝	30½	1 7/16	12 15/16	18	27½	21	3⅛
1-TMRVN9	1½	1	¾	2	7½	3¾	17½	30½	1 7/16	12 15/16	18	27½	21	4⅛
1-TMRVN12	1½	1	1	3	10	3¾	20½	32	2⅞	14 15/16	22⅛	27½	21	4⅛

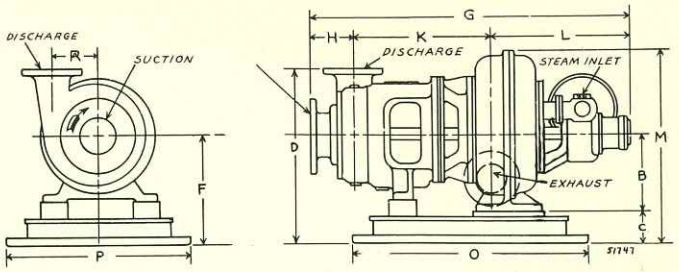
TMRV Units



Size	Pump		Turbine		A	C	D	E	F	G	H	J	L	M	N	O	P
	Suct.	Disch.	Inlet	Exh.													
1½TMRV-16	2½	1½	1½		4	10 15/16	7½	25⅛	13⅜	15⅞	49⅛	6⅞	5¾	20¼	26¼	22	34	23
1½TMRV-20	2½	1½	2		5	11 13/16	7½	26⅝	14⅞	17⅜	53¼	6⅞	5¾	20¾	29⅞	23½	34	29
2TMRV-16	3	2	1½		4	10⅜	8	26⅞	13⅛	15⅞	51⅞	9⅝	5⅝	20¼	26¼	22	34	23
2TMRV-20	3	2	2		5	11⅞	8	28⅜	14⅝	17⅜	56	9⅝	5⅝	20¾	29⅞	23½	34	29

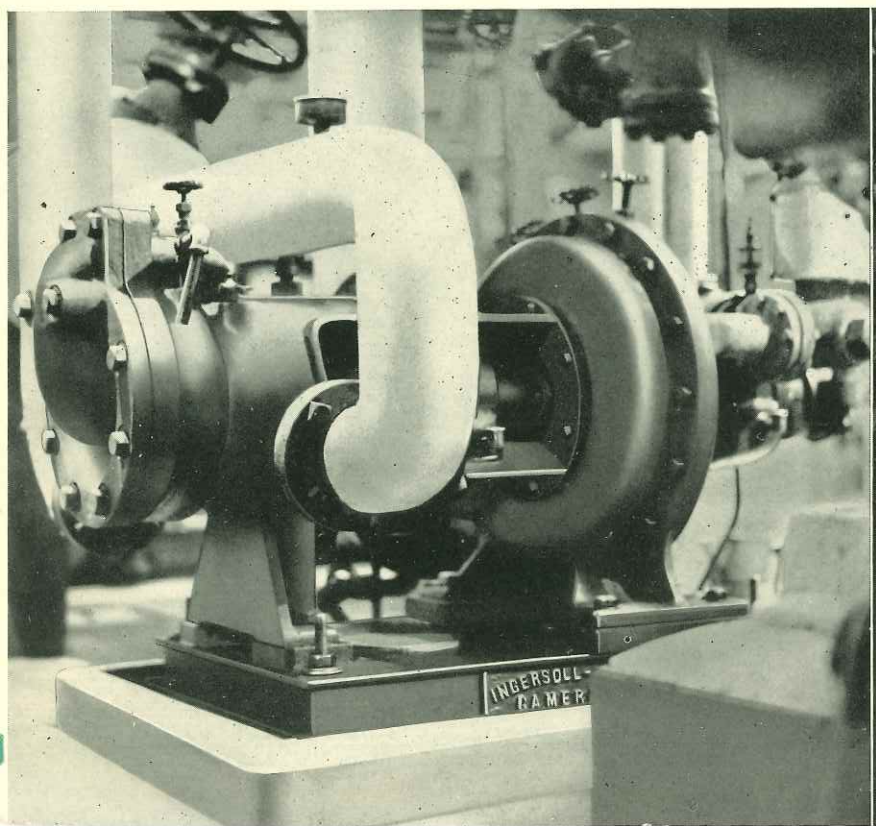
Two-stage, class TMRV, unit on boiler feed service.

TRV Units

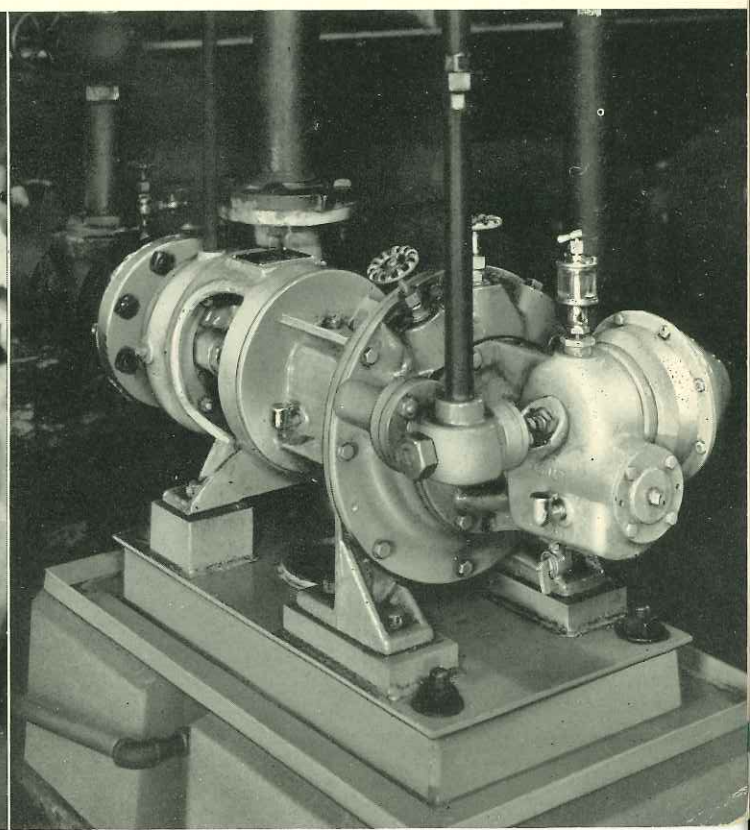


Size	Pump		Turbine		B	C	D	G	H	L	M	O	P	R
	Suct.	Disch.	Inlet	Exh.										
1½TRV9	2	1½	¾	2	7½	3¾	17½	31⅞	4	12 15/16	18	27½	21	2¾
1½TRV12	2	1½	1	3	10	3¾	20	33¼	4	14⅜	22⅛	27½	21	2¾
1½TRVH9	2½	1½	¾	2	7½	3¾	17¾	33⅞	4	12 15/16	18	27½	21	4½
1½TRVH12	2½	1½	1	3	10	3¾	20¼	35¼	4	14⅜	22⅛	27½	21	4½
1½TRVH16	2½	1½	1½	4	11⅝	4¼	22⅜	39¼	4	20¼	26¾	35	25	4½
1½TRVH20	2½	1½	2	5	13⅛	4¼	23⅞	39¼	4	20¾	29⅞	40	29	4½
2TRV9	3	2	¾	2	7½	3¾	17½	36	4⅛	12 15/16	18	27½	21	3⅝
2TRV12	3	2	1	3	10	3¾	20	37⅜	4⅛	14⅜	22⅛	27½	21	3⅝
2TRVH12	3	2	1	3	10	4¼	22	36 7/8	4⅛	14⅜	22⅝	30	21	4¾
2TRVH16	3	2	1½	4	11⅝	4¼	23⅝	40⅞	4⅛	20¼	26¾	35	25	4¾
2TRVH20	3	2	2	5	13⅛	4¼	25⅛	40⅞	4⅛	20¾	29⅞	40	29	4¾
3TRVS9	4	3	¾	2	7½	3¾	17¾	33¼	4¼	12 15/16	18	27½	21	4¼
3TRVS12	4	3	1	3	10	3¾	20¼	34⅝	4¼	14⅜	22⅛	27½	21	4¼
3TRVS16	4	3	1½	4	11⅝	4¼	22⅜	38⅝	4¼	20¼	26¼	35	25	4¼
3TRVH16	4	3	1½	4	11⅝	4¼	23⅞	45¼	5½	20¼	26¼	35	25	5½
3TRVH20	4	3	2	5	13⅛	4¼	29⅜	45¼	5½	20¾	29⅞	40	29	5½
3TRVL12	4	3	1	3	10	3¾	23¼	36 3/8	5½	14⅜	22⅛	27½	21	5½
3TRVL16	4	3	1½	4	11⅝	4¼	25⅜	40⅜	5½	20¼	26¼	35	25	5½
3TRVL20	4	3	2	5	13⅛	4¼	26⅞	40⅜	5½	20¾	29⅞	40	29	5½
4TRVL12	5	4	1	3	10	3¾	23⅞	36 7/8	6	14⅜	22⅛	27½	21	6⅜
4TRVL16	5	4	1½	4	11⅝	4¼	26	40⅞	6	20¼	26¼	35	25	6⅜
4TRVL20	5	4	2	5	13⅛	4¼	27½	40⅞	6	20¾	29⅞	40	29	6⅜
5TRVL20	6	5	2	5	13¼	4¼	24⅝	41⅜	6 3/16	20¾	29⅞	40	29	8⅛

Discharge nozzle may be turned to positions described at bottom of page 9.

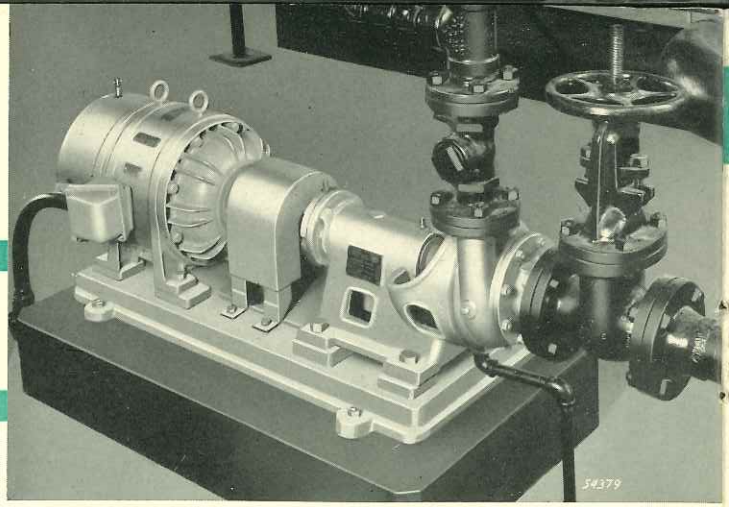


Single-stage, class TRV, unit installed in an ice plant.



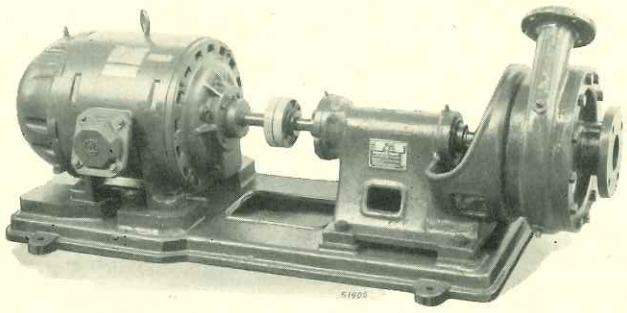
Cradle-Mounted Pumping Units

Heavy-Duty Type Classes CRV and CMRV



Single-stage unit handling wash water in a refinery.

Single-stage units--Class CRV



Single-Stage, class CRV, with motor drive.

Class CRV cradle-mounted pumps are single-stage units which may be coupled to any type of driver. They are available in 1½, 2, 3, 4 and 5-inch discharge sizes. They will handle from 10 to 1400 gals. per min. against heads to 240 ft.

They are quality pumps in every respect. The same sturdy, high-efficiency pump casing is used as on the heavy-duty, class RV Motorpump.

The shaft is extra heavy insuring a smooth running pump and minimum stuffing box care.

The bearing on the pump end is of the two-row self aligning type and carries radial loads only. The bearing on the coupling end is extra large. It is of the single-row, deep-groove type and carries both radial and thrust loads. The bearing housing is part of the cradle and is dust and moisture-tight.

The impeller is balanced both mechanically and hydraulically. A convenient impeller puller makes disassembly easy.

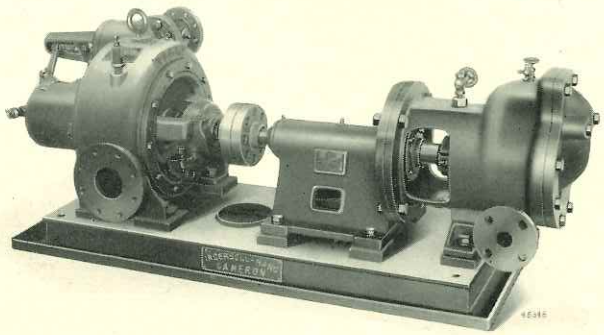
The shaft is fully protected within the pump and through the stuffing box by the impeller and shaft sleeve. The shaft sleeve is packed to prevent leakage under the sleeve. An adjustable needle valve provides proper stuffing box seal and lubrication.

The cradle is of heavy construction and rigidly supports the shaft and casing.

The suction is on the end of the pump and the discharge is part of the casing. The discharge is normally furnished vertical but may be turned at a 90° angle from the vertical. Suction and discharge connections are of standard flange construction.

The units are usually mounted on a base-plate with the driver. When standard N.E.M.A. frame motors are used the base-plate will be cast iron. For other drivers it is usually welded steel.

Two-Stage Units--Class CMRV



Two-stage, Class CMRV, unit with turbine drive.

Class CMRV pumps are two-stage units available in 1½ and 2-inch discharge sizes. They will handle from 20 to 275 gals. per min. against heads to 500 ft.

They have the same quality features as the single-stage units described above. The two impellers are of the single-suction type mounted back to back.

Suction and discharge connections are of standard flange type.

Features of Cradle-Mounted Units

Wearing Rings

Stationary, renewable wearing rings seal impeller hubs against leakage.

Stuffing Box

The stuffing box is extra deep accommodating five or more rings of packing and a sealing gland.

Thrust Bearing

The thrust bearing is extra large and of the single-row, deep-groove type. It carries both radial and thrust loads.

Suction Pipe

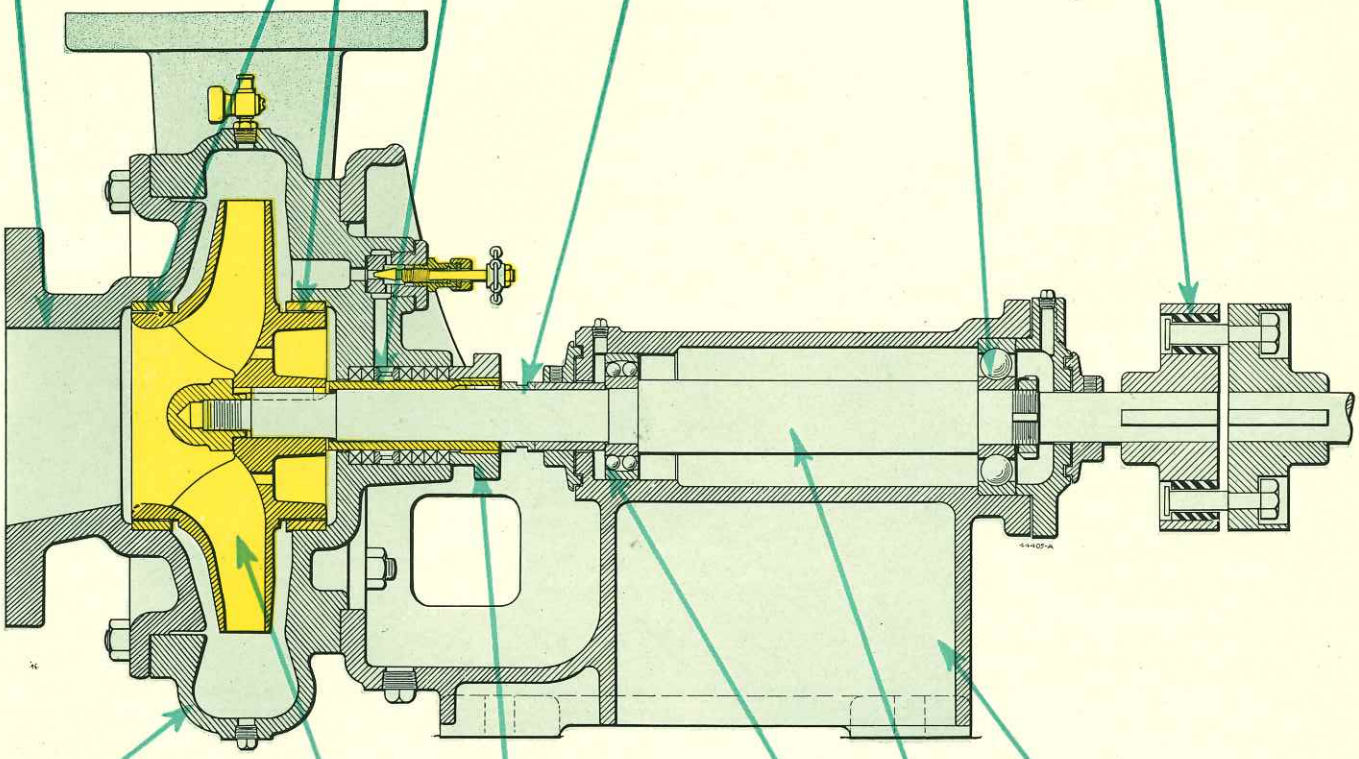
The suction pipe is easily removed and gives access to the impeller.

Impeller Puller

A slotted ring bearing on the shaft sleeve provides an easy means of removing the impeller.

Flexible Coupling

A flexible coupling of ample capacity absorbs end play in the driver shaft and compensates for temperature changes.



Casing

The heavy casing contains the discharge nozzle, which may be turned to four positions.

Glands

The glands are of the split type and may be easily removed from the shaft.

Cradle

The cradle is extra heavy and rigidly supports the casing and shaft.

Impeller

The impeller is of the latest hydraulic design. It is mechanically and hydraulically balanced.

Inboard Bearing

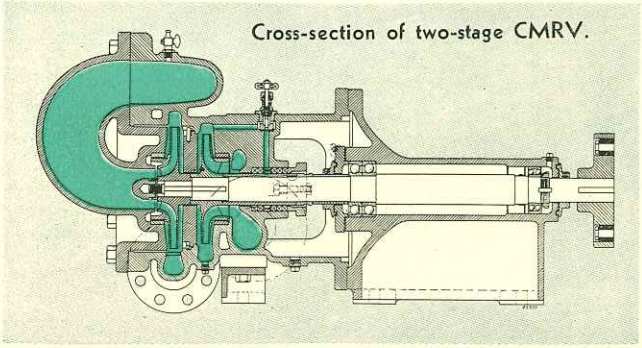
The inboard bearing is of the double-row self-aligning type. It carries radial loads only.

Shaft

The shaft is over-size thus insuring smooth operation and minimum deflection.

Two-Stage Units

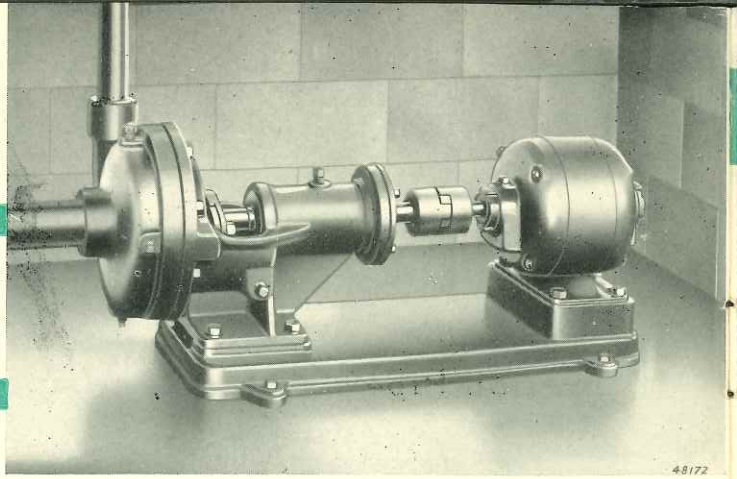
Two-stage units are of same general construction as single-stage units above. The two impellers are placed back to back. The thrust bearing is on the pump end and is of the duplex angular contact type. The pump suction is on the right looking toward the pump and the discharge on the left.



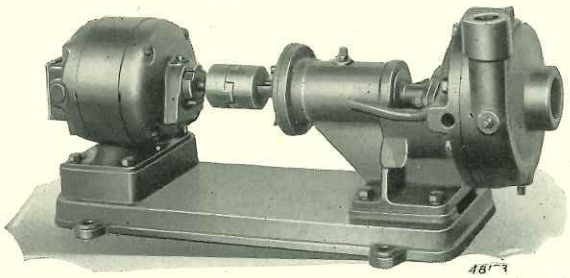
Cross-section of two-stage CMRV.

Cradle-Mounted Pumping Units

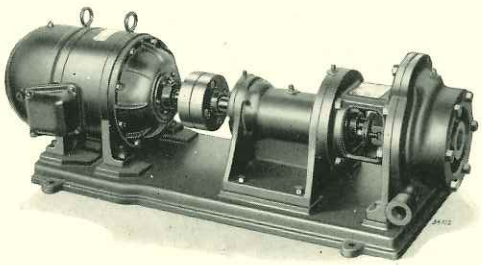
Standard Type Classes CRVN and CMRVN



CRVN unit installed in a manufacturing plant.



Single-stage, class CRVN, unit with motor drive.



Two-stage, class CMRVN, unit with motor drive.

Single-Stage Units--Class CRVN

Class CRVN pumps are single-stage units available in 1, 1½ and 2-inch discharge sizes. They will handle 5 to 250 gals. per min. against heads to 140 ft.

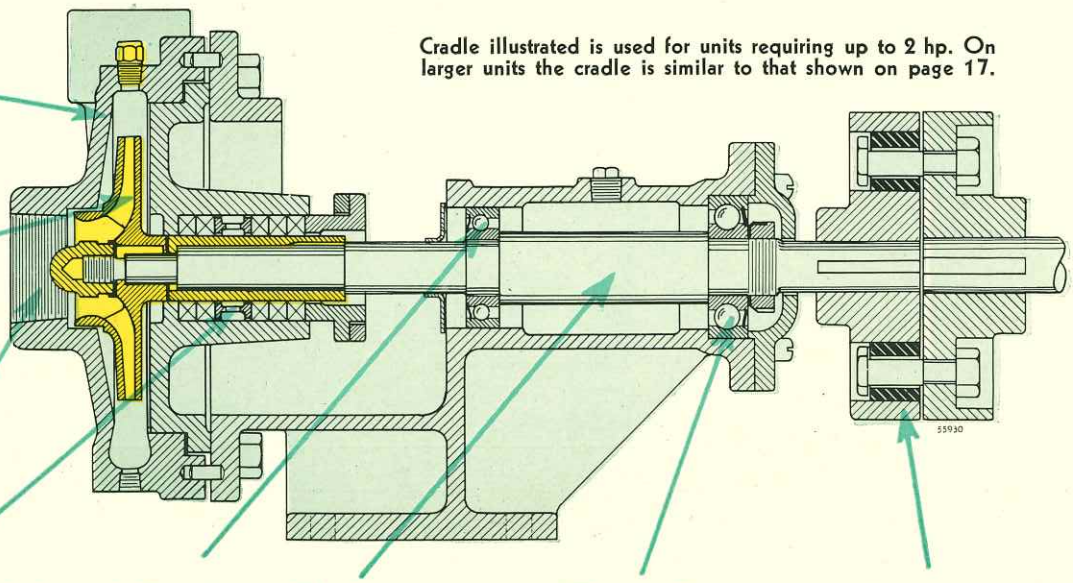
The units use the same high-quality casing and fittings as the standard type Motorpumps described on page 6.

Suction and discharge connections are threaded to receive standard pipe.

Two-Stage Units--Class CMRVN

Class CMRVN pumps are two-stage units available in 1-inch discharge size. They will handle from 20 to 55 gals. per min. against heads to 200 ft. They have suction and discharge connections threaded to receive standard pipe.

Cradle illustrated is used for units requiring up to 2 hp. On larger units the cradle is similar to that shown on page 17.



Casing

The casing contains suction and discharge nozzles. Discharge nozzle may be turned to 4 positions.

Impeller

The one-piece impeller is of latest hydraulic design and is mechanically balanced.

Suction Nozzle

The suction nozzle leads directly into the impeller eye.

Stuffing Box

The stuffing box is extra deep, holding 5 rings of packing and a sealing gland.

Inboard Bearing

The pump end bearing is of single-row, self-aligning type, carrying radial loads only.

Shaft

The shaft is extra-heavy insuring smooth running and minimum shaft deflection.

Thrust Bearing

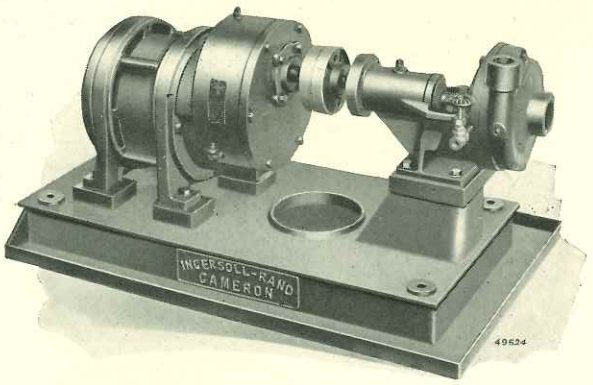
The coupling end bearing is of the single-row, deep groove type and carries both thrust and radial loads.

Coupling

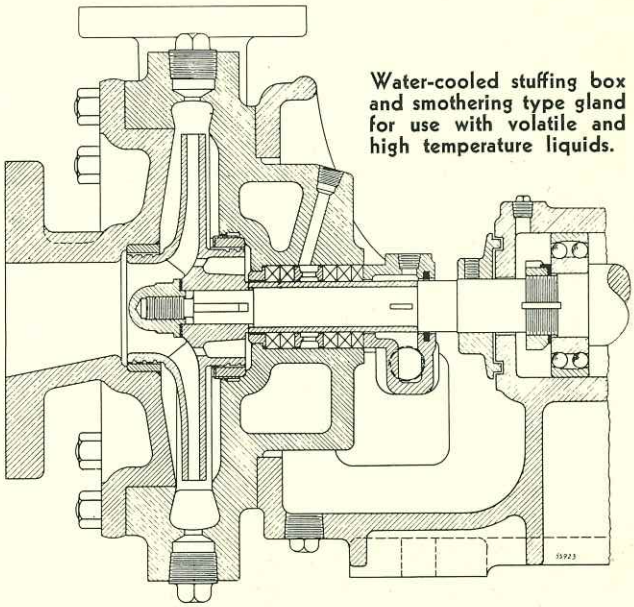
A coupling of ample size compensates for end play in the driver shaft and for temperature changes.

Cradle-Mounted Pump Modifications and Types of Drive

These pumps are available for practically any type of drive. Motor and turbine drives are illustrated on pages 16 and 18 and some additional drives on this page. Most of the mechanical modifications shown on page 7 are also available on these pumps.

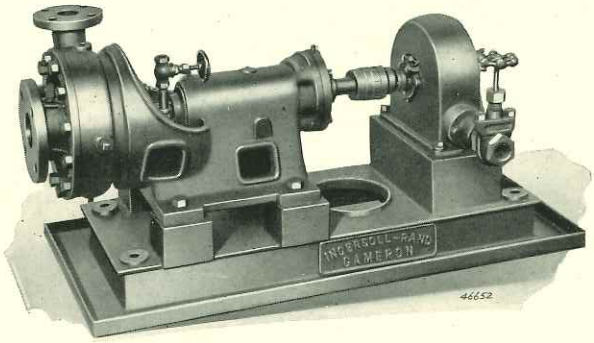


Electric motor drive through increasing gear from 25-cycle motor.

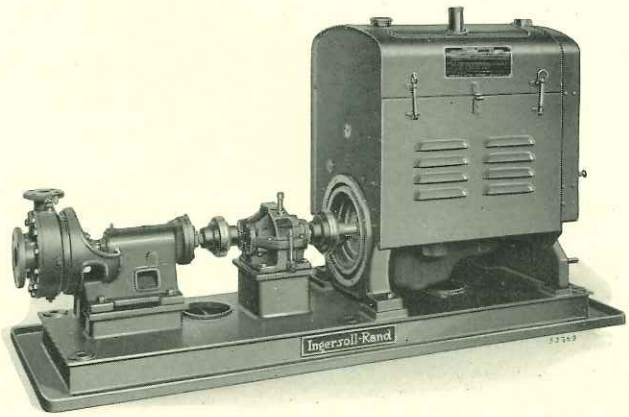


Water-cooled stuffing box and smothering type gland for use with volatile and high temperature liquids.

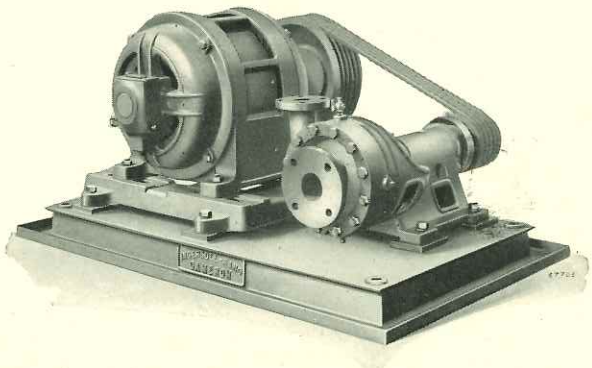
Flat belt drive, less base. This style is widely used for irrigation work and other services where a base is unnecessary. Its flexibility of application and the fact that it can be shipped from stock on a day's notice are greatly increasing its uses.



Water-wheel drive.



Gasoline engine drive through gears.

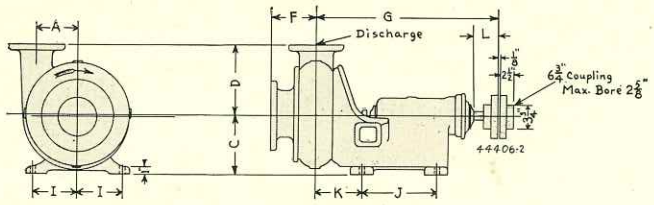


V-belt drive from motor.

Approximate Dimensions of Cradle-Mounted Units

DO NOT USE THESE DIMENSIONS FOR BUILDING FOUNDATIONS. OBTAIN CERTIFIED FOUNDATION PRINT.

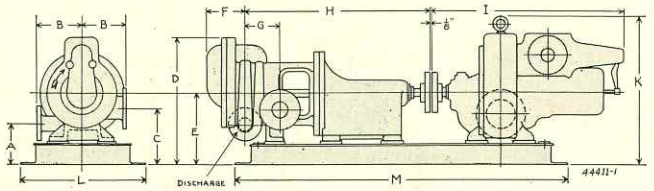
Single-stage units less driver



Size	Suction	A	C	D	F	G	I	J	K	L	Shaft dia. at Coupling	Keyway
1CRVN†	1½	3½	4⅝	4⅜	2	13½	2⅛	3⅜	3¼	2	⅞	¼x⅛x1⅜
1½CRVN†	2	3½	4⅝	5	2⅜	13½	2⅛	3⅜	3¼	2	⅞	¼x⅛x1⅜
1½CRV	2	2¾	6	6¼	4	21⅛	5⅛	8½	5	2 13/16	1¼	⅜x⅜x2½
1½CRVH	2½	4½	6	6½	4	21⅛	5⅛	8½	5	2 15/16	1¼	⅜x⅜x2½
1½CRVL	2	5⅜	6	6¾	4⅜	21⅛	5⅛	8½	5	2 15/16	1¼	⅜x⅜x2½
2CRV	3	3⅝	6	6½	4⅛	21 1/16	5⅛	8½	4 15/16	2 13/16	1¼	⅜x⅜x2½
2CRVH	3	4¾	6	7¾	4⅞	21 1/16	5⅛	8½	4 15/16	2 13/16	1¼	⅜x⅜x2½
2CRVL	3	6½	8	8	5	24 5/16	6⅛	10¼	6⅜	2⅞	1¼	⅜x⅜x2½
3CRVS	4	4¼	6	6½	4¼	21⅞	5⅛	8½	5¾	2 13/16	1¼	⅜x⅜x2½
3CRVL	4	5½	8	9½	5½	24 5/16	6⅛	10¼	6⅜	2⅞	1¼	⅜x⅜x2½
3CRVHS	4	5½	8	8	5½	24 5/16	6⅛	10¼	6⅜	2⅞	1¼	⅜x⅜x2½
3CRVH	4	5½	8	8	5½	24 5/16	6⅛	10¼	6⅜	2⅞	1¼	⅜x⅜x2½
4CRVL	5	6⅜	8	10⅛	6	24 5/16	6⅛	10¼	6⅜	2⅞	1¼	⅜x⅜x2½
5CRVL	6	8⅛	8	8¼	6 7/16	24 5/8	6⅛	10¼	6 11/16	2⅞	1¼	⅜x⅜x2½

All dimensions in inches.
†Threaded suction and discharge connections.

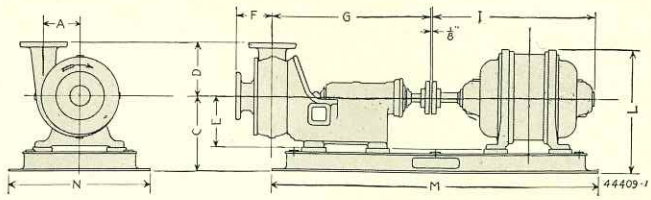
Two-stage units

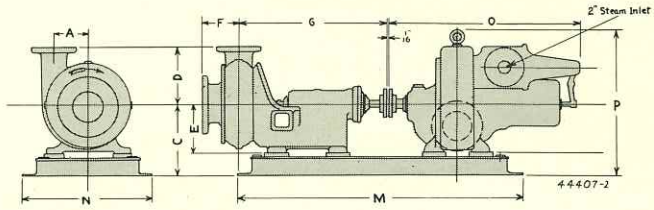


Size	Suction	A*	B	C*	D*	E*	F	G	H	I*	K*	L	M*
1½CMRV	2½	7 7/16	7½	9⅞	21½	12⅜	6⅞	5¾	2–6⅝	2–8	2–1	23	4–8
2CMRV	3	7⅛	8	9⅞	22	12⅝	9⅝	5⅝	2–6⅝	3–0	2–3	23	4–8

*Will vary with size and type of motor, turbine or engine.
All dimensions in inches or feet and inches.

Single-stage units with drivers

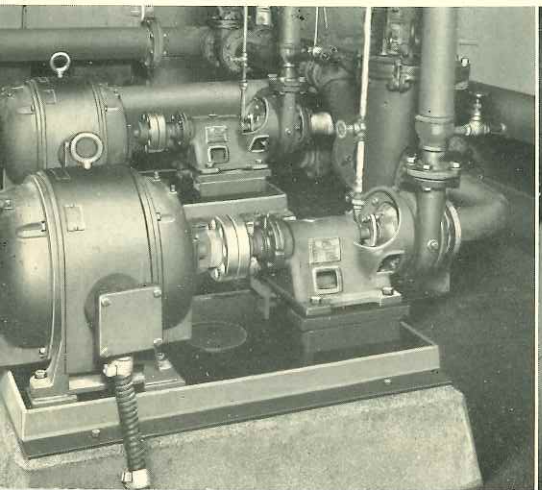




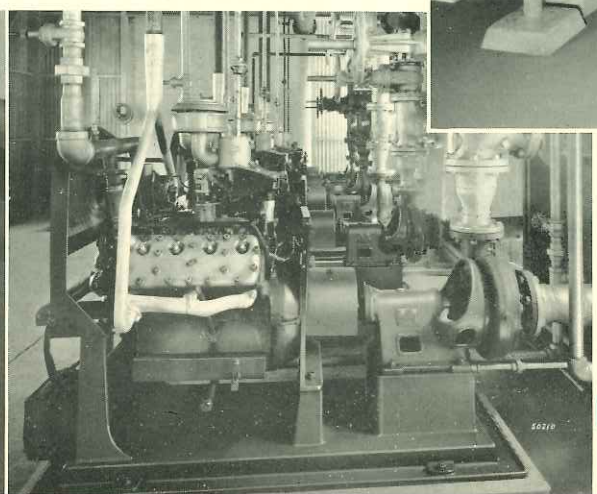
Size	Suction	A	C*	D	E	F	G	I	L	M	N	O*	P*
1CRVN†	1½	3½	6⅜	4⅜	4⅝	2	13½	16⅝	12¾	25	13	24	22
1½CRVN†	2	3½	6⅜	5	4⅝	2⅜	13½	16⅝	12¾	25	13	24	22
1½CRV	2	2¾	10¾	6¼	6	4	21⅛	17⅜	15¾	3–5	21	24	22
1½CRVH	2½	4½	11½	6½	6	4	21⅛	25½	21¼	3–5	21	24½	22
1½CRVL	2	5⅜	10¼	6¾	6	4⅜	21⅛	27¼	20	3–5	21	24	22
2CRV	3	3⅝	12½	6½	6	4⅛	21 1/16	22⅝	20½	3–6	21	19	17⅜
2CRVH	3	4¾	12¼	7¾	6	4⅛	21 1/16	27¼	22	3–11	21	30⅞	24¾
2CRVL	3	6½	13½	8	8	5	24 5/16	22⅝	19½	3–6	21	30	24
3CRVS	4	4¼	14½	6½	6	4¼	21⅞	22⅝	22½	3–5	21	27	24
3CRVL	4	5½	14	9½	8	5½	24 5/16	27¼	21⅜	3–5	21¼	28⅝	27¾
3CRVHS	4	5½	15	8	8	5½	24 5/16	27⅛	24⅝	3–5	21¼	28½	24
3CRVH	4	5½	16	8	8	5½	24 5/16	29	27¾	3–5	21¼	28¼	23¾
4CRVL	5	6⅜	14⅞	10⅛	8	6	24 5/16	29	26⅝	3–5	21¼	30	25
5CRVL	6	8⅛	14⅞	8¼	8	6 7/16	24⅝	29	25⅝	3–5	21¼	30	25

*Will vary with size, type and make of motor or turbine.
All dimensions in inches or feet and inches.
†Threaded suction and discharge connections.

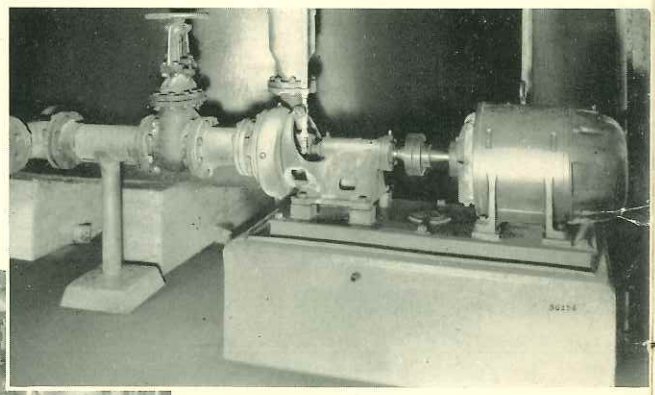
Discharge nozzles may be turned to positions described at bottom of page 9.



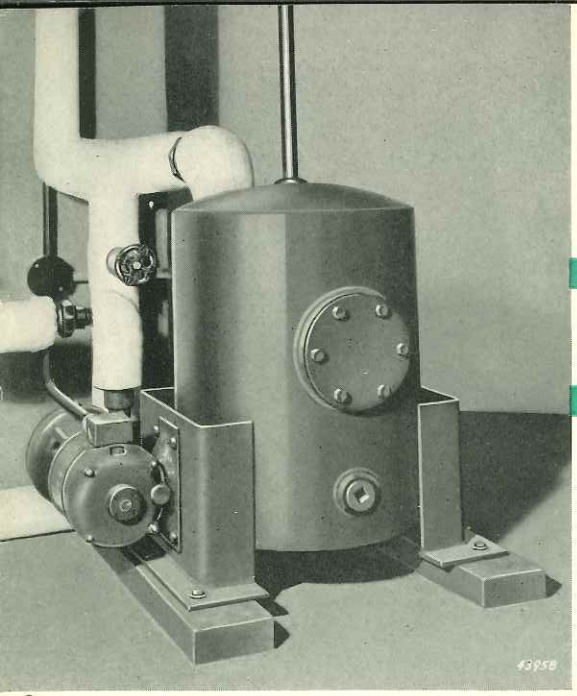
Two, single-stage, cradle-mounted units handling molasses in a sugar refinery.



Five, single-stage, cradle-mounted units handling cooling water in an oil field compressor plant.



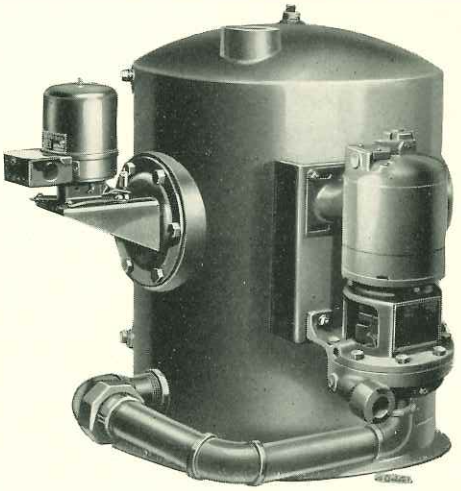
Open-impeller, cradle-mounted umit handling stock in a paper mill



MOTORPUMP Condensate Return Units

Single and Two-pump Types

A single-pump condensate unit mounted on a 15 gallon tank. This unit is used in connection with a steam heating system in a hotel.

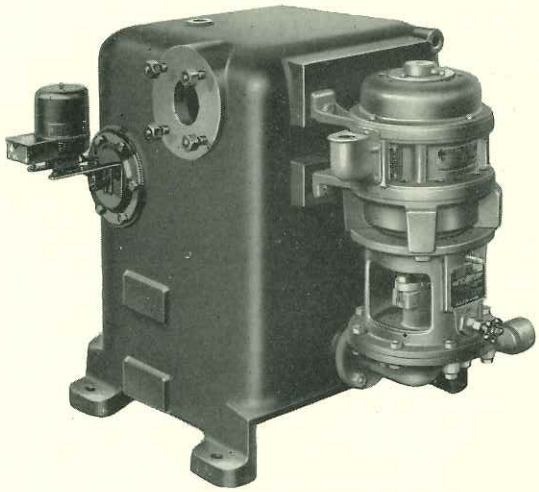


Single-pump unit on 15 gal. tank.

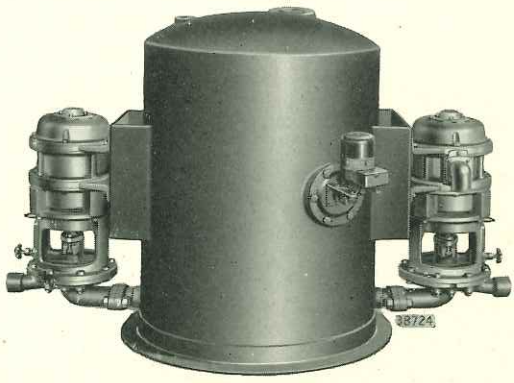
Motorpump condensate return units consist of one or two standard, class RVN, Motopumps mounted on a tank and controlled by a float switch.

They are ideal for returning condensate to a boiler-feed pump, for feeding the boilers directly on low-pressure steam heating systems, for replacing steam traps or for returning condensate produced in process work.

A few standard sizes are listed below. Large capacity units, larger tanks or special mountings can be supplied to meet unusual conditions.



Single-pump unit on 30-gal. tank.



Two-pump unit on 60 gal. tank.

Direct radiation sq. ft.	Max. disch. press. lbs.	Pumps used	Size of reservoir gals.	Pump capacity gals. per min.	Pipe Sizes		One Pump Unit		Two Pump Unit	
					Condensate Inlet	Pump discharge	Floor Space inches	Shipping wt. lbs.	Floor Space inches	Shipping wt. lbs.
1500	10	1RVN¼	15	2¼	2	1	24x28	265	30½x33½	330
3000	10	1RVN¼	15	4½	2	1	24x28	265	30½x33½	330
5000	10	1RVN¼	15	7½	2	1	24x28	265	30½x33½	330
15000	10	1RVN⅓	30	21	3	1	26x30	660	33x36	760
20000	10	1RVN⅓	60	30	3	1	30x40½	460	31x52	580
30000	10	1RVN½	60	45	3	1	30x40½	460	31x52	580
1500	15	1RVN¼	15	2¼	2	1	24x28	285	30½x33½	350
3000	15	1RVN¼	15	4½	2	1	24x28	285	30½x33½	350
5000	15	1RVN¼	15	7½	2	1	24x28	285	30½x33½	350
10000	15	1RVN⅓	30	15	3	1	26x30	660	33x36	760
25000	15	1RVN½	60	36	3	1	30x40½	460	31x52	580
30000	15	1RVN¾	60	45	3	1	30x40½	460	31x52	580
1500	20	1RVN⅓	15	2¼	2	1	24x28	310	30½x33½	390
3000	20	1RVN⅓	15	4½	2	1	24x28	310	30½x33½	390
5000	20	1RVN⅓	15	7½	2	1	24x28	310	30½x33½	390
15000	20	1RVN½	30	21	3	1	26x30	690	33x36	785
25000	20	1RVN¾	60	36	3	1	30x40½	470	31x52	590
30000	20	1RVN1	60	45	3	1	30x40½	470	31x52	590
1500	25	1RVN½	15	2¼	2	1	24x28	310	30½x33½	390
3000	25	1RVN½	15	4½	2	1	24x28	310	30½x33½	390
5000	25	1RVN½	15	7½	2	1	24x28	310	30½x33½	390
10000	25	1RVN¾	30	15	3	1	28x30½	720	33½x42	830
20000	25	1RVN¾	60	30	3	1	30x40½	470	31x52	590
25000	25	1RVN1	60	36	3	1	30x40½	470	31x52	590
30000	25	1RVN1½	60	45	3	1	30x41½	485	31x54½	650
15000	50	1RVN2	30	21	3	1	28x32	770	33½x44½	980
25000	50	1RVNL2	60	36	3	1	30x41½	510	31x54½	700
30000	50	1RVNL3	60	45	3	1	30x41½	510	31x54½	700

A Typical Pump Problem

An industrial plant wishes to install a pump to lift 200 gallons of water per min. at 72°F. from a sump to a tank on the roof. The water is to be delivered into the tank at 10 lbs. pressure. The tank is 58 feet above the pump and the pump is 4 ft. above the water level in the sump. The discharge pipe from the pump to the tank is 400 ft. long and contains 4 standard elbows, 1 check valve, and 1 gate valve. A 2½ inch discharge line is already installed which the manager would like to use if possible. The suction pipe is 4 inches in diameter, 25 ft. long and contains 2 elbows and a foot valve. The pump is to be driven by an electric motor. The current available is 220 volt, 3 phase 60 cycle. A sketch of the layout is shown below.

The friction loss and velocity head can be obtained from the tables on the next page. For comparison two solutions are given: Solution A using 2½" discharge pipe and Solution B using 4 inch discharge pipe.

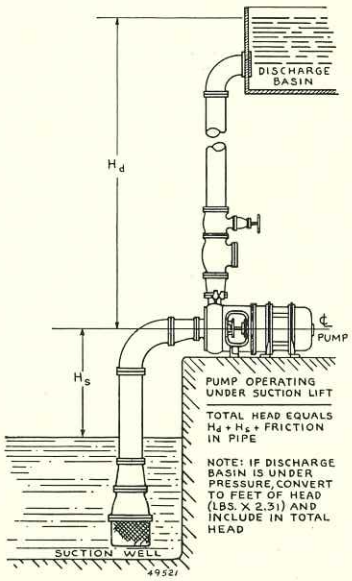
Solution A: shows 278.7′ total head. From page 10 of this bulletin it is seen that a 2MRV25 pump would be required to handle 200 gals. per min. against this head.

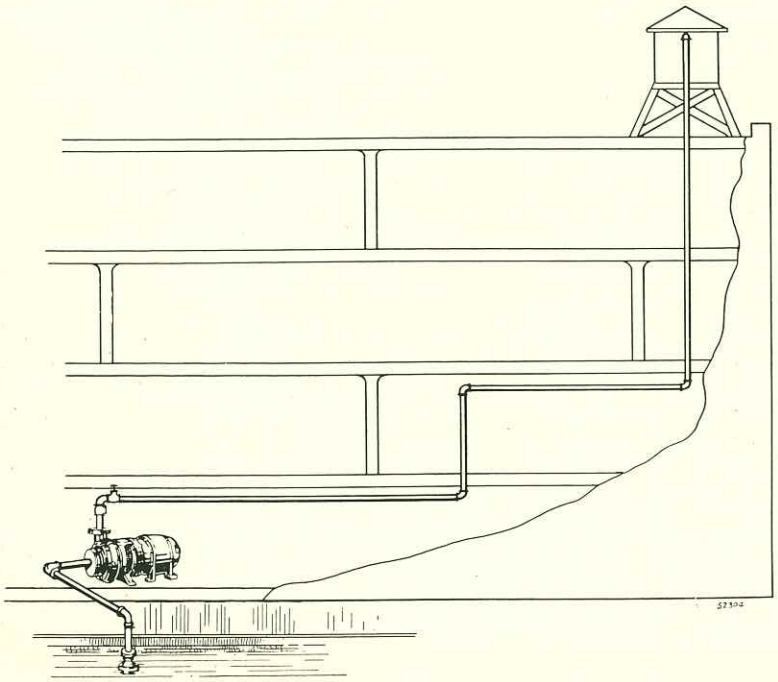
Solution B: shows 108.6 ft. total head. From page 10 of this bulletin it is seen that a 2RV7½ pump will be required.

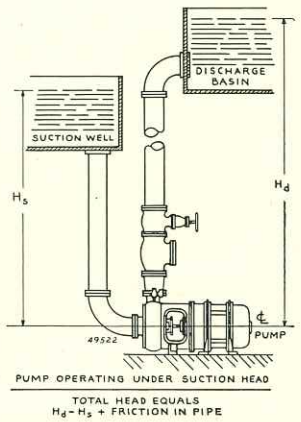
These two problems forcibly point out the savings that a discharge pipe of proper size make possible.

In solution A in which 2½" discharge pipe was used a 25 hp. pump is required. In solution B in which 4" discharge pipe is used only 7½ hp. is required to do the same job.

DISCHARGE HEAD	Solution A 2½" discharge pipe 4" suction pipe		Solution B 4" discharge pipe 4" suction pipe	
Length of discharge pipe		400′		400′
4 ells—equivalent length of pipe	4x5′	= 20′	4x9.22′	= 36.9′
1 check valve equivalent length of pipe	1x22	= 22′	1x41	= 41′
1 valve—equivalent length of pipe	1x1.86	= 1.9′	1x3.44	= 3.4′
Total Length for figuring friction		443.9′		481.3′
Friction loss per 100′		43.1		4.4
Total Discharge Friction Loss	$\frac{43.1 \times 443.9}{100}$	= 191.3	$\frac{4.4 \times 481.3}{100}$	= 21.2′
Static discharge head: pump to tank		58′		58′
Static discharge head: tank pressure	10x2.31	= 23.1′		23.1′
Total Discharge Head		272.4′		102.3′
SUCTION LIFT				
Length of suction pipe		25′		25′
2 ells—equivalent length of pipe	2x9.22	= 18.4′	2x9.22	= 18.4′
Foot valve—equivalent length in feet		0		0
Total Length for figuring friction		43.4′		43.4′
Friction loss per 100′		4.4		4.4
Total Suction Friction Loss	$\frac{4.4 \times 43.4}{100}$	= 1.9′	$\frac{4.4 \times 43.4}{100}$	= 1.9′
Velocity head		.4′		.4′
Static suction lift		4.′		4.′
Total Suction Lift		6.3′		6.3′
TOTAL HEAD				
Total discharge head		272.4		102.3
Total suction lift		6.3′		6.3′
Total Head		278.7′		108.6′







Engineering Data

Horsepower variation with specific gravity

To obtain power required for pumping a liquid of specific gravity differing from that of water, multiply power required when pumping water by specific gravity of liquid being pumped.

Effect of viscosity

Viscous liquids tend to increase pump hp., reduce efficiency, head and capacity. Refer to nearest Ingersoll-Rand branch office for pump performance when liquid to be pumped has a viscosity over 60 S.S.U.

Characteristics of liquids

Liquid	Specific gravity at 60°F/ 60°F.	Viscosity S. S. U.
Beer	1.01	32 at 68°F.
Brine—calcium chloride	up to 1.3	32 to 42 at 68°F.
Brine—sodium chloride	up to 1.2	32 to 36 at 60°F.
Fuel Oil—Nos. 1 and 2	.825 to .95	35 to 45 at 100°F.
Gasoline	.721 to .731	30 at 68°F.
Kerosene	.81	35 at 68°F.
Milk	1.03 to 1.04	32 at 68°F.
Water, fresh	1.0	31.5 at 60°F.

Friction Losses through Screw Pipe Fittings in terms of equivalent lengths of standard pipe.

Nominal Pipe Size, Inches	Actual Inside Diameter, Inches	Gate Valve	Long-Sweep Elbow or on Run of Standard Tee	Medium-Sweep Elbow or on Run of Tee Reduced in Size ¼	Standard Elbow or on Run of Tee Reduced in Size ½	Angle Valve	Close Return Bend	Tee Through Side Outlet	Globe Valve	Check Valve (Approx.) varies with type & make
Factor of	Resistance	0.25	0.33	0.42	0.67	0.90	1.00	1.33	2.00	
½	0.662	0.335	0.442	0.56	0.89	1.20	1.34	1.79	2.68	4.0
¾	0.824	0.475	0.627	0.79	1.27	1.71	1.90	2.52	3.80	5.7
1	1.049	0.640	0.844	1.07	1.72	2.30	2.56	3.40	5.12	7.7
1¼	1.38	0.902	1.19	1.51	2.42	3.24	3.61	4.80	7.22	11.0
1½	1.61	1.09	1.43	1.83	2.92	3.92	4.36	5.79	8.72	13.0
2	2.06	1.49	1.96	2.50	3.99	5.36	5.96	7.92	11.92	18.0
2½	2.46	1.86	2.46	3.13	5.00	6.72	7.47	9.93	14.94	22.0
3	3.06	2.46	3.25	4.11	6.66	8.87	9.86	13.11	19.72	30.0
4	4.026	3.44	4.53	5.77	9.22	12.37	13.70	18.28	27.50	41.0
5	5.047	4.57	6.00	7.68	12.20	16.47	18.30	24.33	36.60	55.0
6	6.065	5.72	7.55	9.61	15.30	20.61	22.90	30.45	45.00	65.0

Foot valve loss is zero, provided foot valve has area of 150.. of suction pipe.

Pipe Friction and Velocity Head

Corresponding to "17 year pipe". For new and smooth iron pipe the head loss will be .7 of that shown.

U.S. Gals. Per Min.	Velocity Head	Head Loss in Feet Per 100 Ft.	U.S. Gals. Per Min.	Velocity Head	Head Loss in Feet Per 100 Ft.	U. S. Gals. Per Min.	Velocity Head	Head Loss in Feet Per 100 Ft.	U.S. Gals. Per Min.	Velocity Head	Head Loss in Feet Per 100 Ft.	U.S. Gals. Per Min.	Velocity Head	Head Loss in Feet Per 100 Ft.	U.S. Gals. Per Min.	Velocity Head	Head Loss in Feet Per 100 Ft.	U.S. Gals. Per Min.	Velocity Head	Head Loss in Feet Per 100 Ft.	U.S. Gals. Per Min.	Velocity Head	Head Loss in Feet Per 100 Ft.
1" Pipe			1½" Pipe			2" Pipe			2½" Pipe			3" Pipe			4" Pipe			5" Pipe			6" Pipe		
3	0.02	1.26	4	0.01	.26	6	0.01	.20	8	0.00	.11	10	0.00	.07	20	0.00	.06	30	0.00	.04	40	0.00	.03
4	0.03	2.14	5	0.01	.40	8	0.01	.33	10	0.01	.17	15	0.01	.15	25	0.01	.09	40	0.01	.08	50	0.01	.04
5	0.05	3.25	6	0.01	.56	10	0.02	.50	12	0.01	.24	20	0.01	.25	30	0.01	.13	50	0.01	.11	60	0.01	.06
6	0.08	4.55	7	0.02	.74	12	0.02	.79	14	0.01	.23	25	0.02	.38	35	0.01	.17	60	0.02	.16	70	0.01	.08
8	0.14	7.8	8	0.02	.95	14	0.03	.94	16	0.02	.41	30	0.03	.54	40	0.02	.22	70	0.02	.21	80	0.01	.11
10	0.22	11.7	9	0.03	1.18	16	0.04	1.20	18	0.02	.50	35	0.04	.71	50	0.03	.34	80	0.03	.27	90	0.02	.14
12	0.31	16.4	10	0.04	1.43	18	0.05	1.49	20	0.03	.61	40	0.05	.91	60	0.04	.47	90	0.03	.34	100	.02	.17
14	0.42	22.0	12	0.06	2.01	20	0.06	1.82	25	0.04	.92	50	0.08	1.38	70	0.05	.63	100	0.04	.41	110	.02	.21
16	0.50	28.0	14	0.08	2.68	25	0.10	2.73	30	0.06	1.29	60	0.12	1.92	80	0.06	.81	120	0.06	.58	125	.03	.26
18	0.70	35.0	16	0.10	3.41	30	0.15	3.84	35	0.08	1.72	70	0.16	2.57	90	0.08	1.00	140	0.08	.76	140	.04	.32
20	0.86	42.0	18	0.13	4.24	35	0.20	5.1	40	0.11	2.20	80	0.20	3.28	100	0.10	1.22	160	0.11	.98	160	.05	.40
25	1.39	64.0	20	0.16	5.2	40	0.26	6.6	50	0.17	3.32	90	0.26	4.08	120	0.15	1.71	180	0.13	1.22	180	.07	.50
30	1.92	89.0	22	0.19	6.2	45	0.33	8.2	60	0.24	4.65	100	0.32	4.96	140	0.20	2.28	200	0.17	1.48	190	.07	.55
35	2.95	119.0	24	0.22	7.3	50	0.40	9.9	70	0.33	6.2	120	0.46	7.0	160	0.26	2.91	220	0.20	1.77	200	.08	.61
40	3.42	152.0	26	0.26	8.4	55	0.49	11.8	80	0.43	7.9	140	0.63	9.2	180	0.33	3.61	240	0.24	2.08	220	.09	.73
1¼" Pipe			28	0.30	9.7	60	0.58	13.9	90	0.54	9.8	160	0.82	11.8	200	0.41	4.4	260	0.28	2.41	240	.11	.87
			30	0.35	11.0	65	0.68	16.1	100	0.66	12.0	180	1.04	14.8	220	0.49	5.2	280	0.33	2.77	260	.13	1.00
4	0.01	.57	35	0.47	14.7	70	0.79	18.4	120	0.95	16.0	200	1.28	17.8	240	0.58	6.2	300	0.37	3.14	280	.16	1.14
5	0.02	.84	40	0.62	18.8	75	0.91	20.9	140	1.30	22.3	220	1.55	21.3	260	0.69	7.2	320	0.42	3.54	300	.18	1.30
6	0.03	1.20	45	0.78	23.2	80	1.04	23.7	160	1.70	29.0	240	1.84	25.1	280	0.79	8.2	350	0.51	4.19	320	.20	1.47
7	0.03	1.59																					
8	0.05	2.03	50	0.96	28.4	90	1.31	29.4	180	2.15	35.7	260	2.16	29.1	300	0.91	9.3	300	0.66	5.4	350	.24	1.70
			55	1.17	34.0	100	1.62	35.8	200	2.66	43.1	280	2.51	33.4	320	1.04	10.5	450	0.84	6.7	380	.28	2.00
10	0.07	3.05	60	1.39	39.6	110	1.96	42.9	220	3.22	52.0	300	2.88	38.0	340	1.17	11.7	500	1.04	8.1	400	.32	2.20
12	0.10	4.3	65	1.62	45.9	120	2.33	50.0	240	3.82	61.0	320	3.28	42.8	360	1.31	13.1	550	1.26	9.6	450	.40	2.74
14	0.14	5.7	70	1.88	53.0	130	2.73	58.0	260	4.48	70.0	340	3.71	47.9	400	1.62	16.0	600	1.49	11.3	500	.50	2.90
16	0.18	7.3																					
18	0.23	9.1	75	2.17	60.0	140	3.17	67.0	280	5.20	81.0	360	4.15	53.0	450	2.05	19.8	650	1.75	13.2	550	.60	3.96
			80	2.46	68.0	150	3.64	76.0	300	5.98	92.0	380	4.62	59.0	500	2.53	24.0	700	2.03	15.1	600	.72	4.65
20	0.28	11.1	85	2.78	75.0	160	4.14	86.0	320	6.80	103.0	400	5.11	65.0	550	3.06	28.7	750	2.34	17.2	700	.98	6.21
25	0.45	16.6	90	3.09	84.0	170	4.67	96.0	340	7.68	116.0	420	5.64	71.0	600	3.65	33.7	800	2.66	19.4	800	1.28	7.96
30	0.65	23.0	95	3.47	93.0	180	5.23	107.0	360	8.60	128.0	440	6.20	77.0	650	4.28	39.0	850	2.99	21.7	900	1.62	9.92
																					1000	1.99	12.02

Other I-R Products

Aftercoolers, Air and Gas

Air- and Gas-Lift Pumps

Blowers, Air and Gas

- Exhausters
- *Motorblowers*
- Turbo-Blowers
- Turbo-Compressors

Core Drills

- *Calyx*
- *Coroc*
- *Explorer*
- Diamond
- Manhole
- Pavement-Testing
- Prospecting
- Shaft-Work

Compressors

- Air and Gas
- Air- and Water-Cooled
- Ammonia
- Combined Engine-Compressor Units for Steam, Gas and Oil Drive
- Direct-Connected Electric and Belted
- High- and Low-Pressure
- Mine-Car
- *Motorcompressors*
- Portable
- Service-Station
- Single- and Multi-Stage
- Vacuum Pumps

Condensers

- Counter-Current Barometric, *Disc-Flow*
- Ejector-Jet Barometric
- Surface, *Heart-Shape*

Drill Steel and Jackrods

Engines

- Stationary Diesel
- Stationary Gas
- Marine Diesel

Hoists

- Air- and Electric-Driven
- Air-Motor (Direct-Lift)
- Gasoline- and Oil-Engine Driven
- Scraper
- Single-, Double- and Three-Drum
- Slusher
- *Tugger*
- *Utility*

Jackbits

- Jackbit Grinders
- *Jackbits* (Detachable Bits)
- *Jackmills*
- *Jackrods* (Drill rods threaded for Jackbits)
- Jackrod Threading Equip't

Paving Breakers

- Demolition Tools

Pile Drivers

Pneumatic Tools

- Accessories and Hose
- Backfill Tampers
- Chippers
- Calking Hammers
- Concrete Vibrators
- Core Breakers
- Diggers
- Drills, *Multi-Vane* and Piston
- Fender Straightener
- Grinders, *Multi-Vane* and Piston
- *Impact Wrenches*
- Riveters and Holders-On
- Sanders
- Sand Rammers
- Saws, *Safety First*
- Scaling Hammers
- Screw Drivers and Nut Setters
- Stationary Motors
- Surfacers
- Wire Brushes
- Wood Borers
- Wrenches, Torque and Impact

Pneumatic Sump Pumps

Pumps (Cameron)

- Boiler-Feed
- Brewery
- *Cam-Pump* (Rotary)
- Centrifugal
- Chemical
- Circulating
- Condensate-Return
- General-Service
- High-Pressure
- Hot-Oil
- Mine
- *Motorpumps*
- Paper-Stock
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Receivers, Air and Gas

Refrigerating Units

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- *Auto-Feed*
- Drifters
- *Jackbits*
- *Jackhamers*
- Mountings
- *Pickhamers*
- *Power-Feed*
- *Stopehamers*
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- Wagon-Mounted

Sharpeners and Furnaces

Tie-Tamper Units

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